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CONTENTS

Language, Socio-Economic Status and the School: An Exploratory Study	187
<i>Lois Foster and Mary Nixon</i>	
Ethnic Segregation in Toronto's Elementary Schools	195
<i>S. B. Lawton and G. P. O'Neill</i>	
An Investigation of Open-Book and Closed-Book Examinations in Mathematics	202
<i>Shirleyanne Michaels and T. R. Kieren</i>	
Personality Characteristics of Male and Female Prospective Teachers: A Multivariate Analysis	208
<i>H. G. Richek</i>	
Role of Conceptual Tempo in Concept Formation	216
<i>W. George Cathcart and Werner W. Liedtke</i>	
Part-Time Teachers of Adults	224
<i>J. A. Draper and M. Elizabeth Smith</i>	
Environmental Variables Relevant to the Development of Cognitive Abilities	232
<i>Alan D. Bowd</i>	
Education in the Northwest Territories—Review Article	242
<i>N. C. Bhattacharya</i>	
Review Notices	255
Other Books Received	257
Table of Contents — Volume XVIII, 1972	

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Language, Socio-Economic Status and the School: An Exploratory Study

This study was designed to test the following hypothesis in Alberta: the higher the socio-economic status the more complex the use of language. Data were collected from 20 subjects located in two schools by means of three instruments—interview, essay and sentence completion. Contrary to the Bernstein (1961, 1966, 1971) theory of linguistic codes and the empirical work done by Lawton (1968) there were few differences between students from high socio-economic backgrounds and low socio-economic backgrounds. (Lois Foster and Mary Nixon are doctoral students in the Faculty of Education, The University of Alberta).

It has been posited by Bernstein (1966) that children from certain socio-economic backgrounds are handicapped in the school setting by lack of an 'elaborated code' type language. He suggests that middle class children are exposed to an 'elaborated code' which has distinctive, syntactical features as well as more cognitively abstract referential functions than the 'restricted code' of the lower classes. The absence of exposure to this 'elaborated code' in the lower classes is held to be influential in causing the poorer tested performance of the lower class on a number of intellectual tasks.

Lawton (1968:102) believes that Bernstein's theory is important in that "it relates social structure, verbal planning, language and educability." However, Moffit (1972) asserts that Bernstein's definitions of critical concepts are far from clear and that this limits the utility of the theory. Yet Bernstein's work has been influential in educational thought and many compensatory programs for the culturally deprived have been influenced by Bernstein's linguistic code conceptions.

Bernstein himself is careful to point out that the 'restricted code' is not so much 'inferior' as 'different'. He would appear to have little patience

with such programs as the one developed by Bereiter and Engelman (1968) which focuses upon teaching the 'elaborated code' as a second language to disadvantaged children. It is the school and the teacher rather than the child that must change.

Much of the contexts of our schools are unwittingly drawn from aspects of the symbolic world of the middle class, and so when the child steps into the school he is stepping into a symbolic system which does not provide for him a linkage with his life outside. (Bernstein, 1971: 199)

Despite the influence that Bernstein's work has had upon educators, the empirical support for his theory is derived solely from British research. Lawton (1968) and Taylor (1972) have both provided evidence that linguistic output is related to social class. However, this poses the problem of whether these results can be generalized from the British to the Western Canadian setting.

Complex use of language is associated with high socio-economic status (Bernstein, 1961, 1966, 1971; Lawton, 1968) and linguistic deprivation with low socio-economic status (S.E.S.). Taylor (1972) has stated that when this idea is applied to students in England "they may be assigned positions along a continuum from deprived to privileged, both socially and linguistically." In this study, carried out in Western Canada, the indicators chosen to assess complexity of language usage were an interview, an essay and an open-ended sentence completion test.

Method

In this study the null hypothesis tested was: That there is no difference in the complexity of language used as between students of high S.E.S. and low S.E.S. in two Edmonton Public Schools.

Subjects

Twenty Grade VII students were selected from two schools in Edmonton, Alberta. Ten of these—five boys and five girls—were drawn from a school in a prosperous suburb of the city. Only those with average I.Q. scores and from high socio-economic homes were selected. This group was then matched for age, sex, I. Q. and grade level from a school in the older part of the city, selecting only students from low socio-economic homes.

The socio-economic status of the students was assessed by the subjective evaluations of the school principals and by Blishen's 1967 Socio-Economic Index for Occupations in Canada. On this index the modal category for students in the high socio-economic group was 75.41, the range was 76.44 to 63.75. In the low socio-economic group the modal category was 30.47, the range being 40.14 to 29.26.

The sample of twenty students was divided into four groups:

- Group 1—5 boys of high socio-economic status
- Group 2—5 girls of high socio-economic status
- Group 3—5 boys of low socio-economic status
- Group 4—5 girls of low socio-economic status.

The Lorge Thorndike Verbal and Non-Verbal Tests of Mental Ability, administered in the spring of 1972, were used for I.Q. assessment. Elaborated code was operationally defined as ability on the test instruments

and restricted code was operationally defined as lack of ability on the three test instruments.

Instruments

The three tests were administered to all four groups. The first test consisted of a structured interview during which an independent observer assessed the non-verbal communication. Verbal responses were recorded on tape and later transcribed for purposes of inter and intra group comparisons. Students were then asked to give a written response in essay form to the question, "What do you think is the real purpose of education?" Responses were analysed for content by three independent judges in terms of an abstraction scale and a generalization scale. The written responses were further analysed to determine: (1) length (number of words written), (2) mean sentence length, (3) number of subordinate clauses, (4) number of subordinate clauses divided by finite verbs, (5) number of adjectives divided by total words, (6) number of adverbs divided by total words, (7) number of personal pronouns divided by total words, and (8) number of passive verbs divided by total words. The third test was comprised of ten incomplete sentences. In each successive sentence subjects were required to add an increased number of words. The sentences were analysed to determine: (1) total coordinations, (2) total subordinations and (3) total subordinate clauses divided by total finite verbs.

Two statistical tests appropriate to the written data were applied. With respect to the ratings made by the three judges of the essay test, use was made of a standard computer program for obtaining a one-way analysis of variance for inter-judge reliability. Interpretation of the analysis enables us to conclude that the difference between judges is not a systematic source of variation. The Mann-Whitney U Test was used on the written data to test the significance of inter-class and intra-class differences based on group mean scores.

Results

Interview

Lawton (1963:40) has pointed out that linguistic functioning differs as between written and oral language, and that a higher level of abstraction is required for written speech. Since this distinction does exist a structured interview was included. The interviews were evaluated for verbal content, fluency and non-verbal communication skills (i.e. gesture and facial expression).

From Table 1 it would appear that there is little overall difference within the categories of response between the groups. When the transcripts were examined it was equally true of all groups that colloquialisms as "yeah" and "like" were frequently used. For example:

High S.E.S. Girl 5: Yeah . . . he's a doctor.

Low S.E.S. Boy 3: She knew how to . . . like . . . have discipline.

High S.E.S. Boy 3: Well . . . then you don't know really like how smart or what your average is.

Low S.E.S. Girl 2: It's not fair to the other children . . . like . . . their answers and another person takes them from them.

TABLE 1
 FREQUENCY DISTRIBUTION OF RATINGS
 FOR STRUCTURED INTERVIEW, BY GROUP N=30

Group	Type of Question	Category of Response		
		Poor	Average	Good
1 (High S.E.S. boys)	Description	3	1	1
	Abstract	2	3	0
	Abstract moral	1	4	0
2 (High S.E.S. girls)	Description	4	1	0
	Abstract	5	0	0
	Abstract moral	1	3	1
3 (Low S.E.S. boys)	Description	4	1	0
	Abstract	5	0	0
	Abstract moral	1	3	1
4 (Low S.E.S. girls)	Description	3	1	1
	Abstract	2	3	0
	Abstract moral	1	4	0

There was no apparent difference between the groups in their ability to structure their language to provide a description of their family. For example:

High S.E.S. Boy 2: Well . . . we do a lot of skiing . . . lots of hiking . . . and I take music lessons. And my mom and dad and my brother we take karate lessons . . . and my two sisters take ballet . . . and we live down by Storyland Valley Zoo.

Low S.E.S. Boy 1: My mom works in the restaurant . . . and my dad does too and he goes to help my mom whenever he gets a chance. And my brother works at the restaurant and my other brother does too. And one sister is married.

The level of abstraction attained was approximately the same for all groups but the low S.E.S. participants expanded their points about teachers more than did the participants from the high S.E.S. groups.

High S.E.S. Girl 3: Well . . . she was kind to everyone . . . she made school fun.

Low S.E.S. Girl 4: He was an understanding teacher. He was very nice . . . he was very understanding. He'd ask us to do something but if we really didn't like to do it he would give us something else to do but we would have to do something.

A possible explanation of this greater elaboration is that for low S.E.S. students the teacher is a more important adult model.

There was a general lack of fluency exhibited by all groups. Despite this, however, gesture and facial expression gave a life to the interviews which cannot be communicated by the written transcripts. The high S.E.S. children accepted the interview situation without apparent strain. They gave the impression of being at ease with adults, answering freely, smiling

and relaxed in posture. The low S.E.S. students found the situation more novel and responded cooperatively. In general they were less at ease in the interview situation. This lack of social ease was displayed by restless feet, apprehensive facial expressions, erect spines and, in some cases, monosyllabic responses. One interesting exception was Girl 2 whose manner resembled that of the high S.E.S. students. Her transcript indicated that she was an only child and it is possible that she had had greater interaction with adults.

TABLE 2
AVERAGE NUMBER OF WORDS, MEAN SENTENCE LENGTH
FOR ESSAY, BY GROUP N=20

Group	Average Number of Words Written in 30 Minutes	Mean Sentence Length ¹
1 (High S.E.S. boys)	123.4	20.9
2 (High S.E.S. girls)	111.8	18.9
3 (Low S.E.S. boys)	76.8	24.1
4 (Low S.E.S. girls)	180.4	19.4

¹Total words divided by total number of sentences.

Table 2 shows the average number of words and mean sentence length for the four groups. One interesting aspect was the high S.E.S. boys wrote almost twice as many words as low S.E.S. boys whereas low S.E.S. girls wrote approximately 33 percent more words than high S.E.S. girls. It is also worthy of note that low S.E.S. girls had the highest average number of words of any of the groups. When the mean sentence length was examined, although Groups 2 and 3 wrote comparatively few words, Group 2 arranged the words in short sentences, Group 3 in long sentences. When the original essays were analysed it was evident that the additional length was not due to the ability to construct complex sentences but rather to the heavy reliance upon the use of coordinations.

For example:

Low S.E.S. Boy 2: So when you get older you can get a job because if you do not have a grade twelve education you will not get a job because when you go for a job one of the first things they ask you is if you were a dropout and if you were they will not let them work with you because they do not want a dropout working for them.

The Mann-Whitney U Test was used to test the hypothesis that there is no difference in complexity of language usage between the groups.

Comparing the use of different parts of speech and controlling the sentence length, there was no pronounced intra-class or inter-class difference between the groups. The only significant difference which appeared ($p = .02$) was between groups one and three in their use of adjectives.

TABLE 3

COMPARISON OF USE OF PARTS OF SPEECH FOR ESSAY, BY GROUP

Groups Compared	Passive/ Finite Verbs	Pronouns/ Total Words	Adverbs/ Total Words	Adjectives/ Total Words	Subordinations/ Finite Verbs
	u	u	u	u	u
1 v 2	10	8	9	7	5
3 v 4	11	6	11	12	11
1 v 3	10	9	8	2*	10
2 v 4	6	10	11	9	5
(1+3)v(2+4)	49.5	28	44.5	31.5	32
(1+2)v(3+4)	49.5	37.5	46.5	23.5*	38.5

*Only this difference between groups 1 and 3 is significant (at the 0.02 level)

Reliability, obtained from one way analysis of variance, indicates that when the experiment is repeated with another set of judges and the same subjects, the correlations between the mean ratings obtained from the two sets of data on the same test would remain approximately the same. Reliabilities obtained were generally acceptable at the 0.60 level and above. However, there were anomalies which might have been due to lack of detailed instructions calling attention to the fact that the scoring for the generalization scale and the abstraction scale were differently ordered.

Sentences

The sentence completion test provided little evidence of inter-class or intra-class differences in sentence construction. The linking of similar statements by such conjunctions as 'and', 'but' and 'so' (coordinations) were extensively used by all groups. Low S.E.S. boys used almost twice as many coordinations (44) as high S.E.S. boys (25). However, low S.E.S. girls resorted to their use with approximately the same frequency as high S.E.S. girls. (Low S.E.S. girls 36 coordinations; high S.E.S. girls 37 coordinations).

Subordinations, or the use of subordinate clauses (i.e. adjectival, adverbial clauses) were used most frequently by low S.E.S. girls (42) and high S.E.S. boys (38). As might be predicted from their heavy reliance on coordinations, low S.E.S. boys used the smallest number of subordinations (31).

Discussion

As has been mentioned previously, the purpose of the study was two-fold: (1) to add to the empirical evidence regarding Bernstein's theory of linguistic codes and (2) to discover whether a theory of class-linked

linguistic codes is appropriate to the Western Canadian setting. To assess differences in language usage between students whose fathers ranked high on a socio-economic index and students whose fathers ranked low on this index (Blishen, 1967) written and oral indicators based on previous work (Lawton, 1968) were used.

When I.Q., age and grade level were controlled there were few significant differences in the complex use of language as between high and low S.E.S. students from two Edmonton Public Schools. This exploratory study indicated that there may be differences in the Western Canadian social structure which invalidate a direct application of Bernstein's conception of elaborated and restricted language codes. In the absence of other empirical studies, the following explanation is somewhat tentatively offered. The more fluid social structure of this youthful Canadian city places less emphasis on language as an indicator of social class.

In Britain social class still exerts a powerful influence on parental choice of school. Social class combined with differential schooling may therefore be productive of the language differences described by Bernstein. The students in this study were products of the same type of educational environment. The Edmonton Public School Board controls the schools within its jurisdiction. Although the two schools were located in different parts of the city they may be judged to be approximately the same in terms of teacher education, curricula, class size and school facilities.

It must be kept in mind that the sample was small, therefore the generalizations which can be made from the study are limited. One problem posed by research of this type is the detailed content analysis that is required. However, the findings of this exploratory study suggest the need for further research. Further insights might be provided by longitudinal studies to indicate the possible interaction of S.E.S. and age in language development and by using more refined indicators of differential use of language. In addition to these methodological aspects, an added dimension would be the comparison of language codes (restricted vs. extended) as between white and non-white Canadian groups, such as Métis and Indians.

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Ethnic Segregation in Toronto's Elementary Schools

The effect of ethnic residential segregation on school achievement has raised considerable debate in recent years. This study examines the question as it relates to the Toronto public elementary school system. Segregation indexes were calculated for each ethnic group and attempts were made to account for differences that we observed. Findings indicated that the Portuguese and Italian students were the most segregated while the Chinese and Greek students were least segregated. The Toronto study, although different in some respects from studies in American cities, seemed to indicate that Toronto's segregation patterns were similar to those in other North American cities. Conclusions regarding the effect of ethnic segregation on academic achievement were inconclusive. (Dr. Stephen B. Lawton and Mr. G. Patrick O'Neill are both in the Departmental of Educational Administration, O.I.S.E.).

School segregation as an outgrowth of residential segregation is an issue that has received considerable attention in North America, particularly as it concerns blacks and whites. However, segregation also exists among other ethnic minorities, as Taeuber (1966) has clearly illustrated. In extending the study of ethnic segregation to Canadian schools, this study has three objectives—the description of the pattern of school segregation for five major ethnic groups in the city of Toronto, the comparison of findings for Toronto with those for other North American cities, and the description of the relationship between the extent of segregation and the percentage of students in special education classes.

Background

In the late nineteenth and early twentieth centuries, Toronto, like many North American cities, experienced rapid growth caused by immigration from overseas. This growth resumed following World War II, yet because

of the emphasis in Canadian society on the concept of "multiculturalism within a bilingual framework," there has not been a strong demand for integration and cultural assimilation of minority groups, as has historically been the case in the United States (Clark, 1968; Ossenberg, 1971). As a result, Toronto has become a mosaic of special institutions serving the many cultural, political, social, economic and religious needs of a multi-ethnic clientele (Richmond, 1970).

In 1970, certain groups in the city of Toronto expressed concern that children from low socio-economic and immigrant families were disproportionately represented in special education classes. In response to their requests, the Toronto Board of Education conducted "The Every Student Survey" (Wright, 1970), in which literally every student in Toronto's elementary and secondary public schools was studied. The survey confirmed that certain ethnic groups were, in fact, over-represented in special education classes. The findings suggested that numerous factors might explain the program placement of students from different ethnic groups. Among these factors, Wright (1970) considered socio-economic status (occupational level), parental aspirations and the achievement values of the home environment. In a follow-up study, Wright (1971) reviewed other "critical factors" which, likewise, could account for the over or under-representation of certain ethnic groups in remedial courses. These included: parental attitudes, cultural frameworks and parental behaviours (models). In conclusion, he stated, "Culture, which includes beliefs, values and styles of living and learning, then seems to be a critical variable relevant to school success (p. 23)."

One variable not considered by Wright, although mentioned by Coleman (1966), is the effect of segregation on school achievement. Coleman found that children from similar family backgrounds, when enrolled in schools with contrasting social compositions, achieved at quite different levels. The effect was less for white pupils than for any minority group other than Orientals. Thus, "if a white pupil from a home that is strongly and effectively supportive of education is put in a school where most pupils do not come from such homes, his achievement will be little different than if he were in a school composed of others like himself (p. 22)." On the other hand, "if a minority pupil from a home without much educational strength is put with schoolmates with strong educational backgrounds, his achievement is likely to increase (p. 22)." In summary, Coleman noted, "the composition of student bodies has a strong relationship to the achievement of Negro and other minority pupils (p. 22)." The study reported here explores this relationship further in the Toronto public elementary school system, and attempts to answer the question, is the degree of segregation of students of different ethnic groups directly related to their academic achievement?

Methodology

The population investigated included the total elementary school population of Toronto's five major ethnic groups: the Chinese, Greek, Italian, Portuguese, and English-speaking Canadians. To fulfill the three objectives of the study, the following procedures were followed. First,

“index of dissimilarity” values were calculated to provide a description of the degree of separation in the schools between each pairing of the five ethnic groups. The index of dissimilarity (denoted by the letter D) ranges on a continuum from 100, which denotes complete separation between two groups, to zero, which denotes no separation (Lawton, 1972). Also, “index of segregation” values (denoted by the letter S) were calculated to measure the separation of each ethnic group from “all other” groups considered in the study (Bojean, et al. 1967). The index of segregation is similar to the index of dissimilarity except that one group is compared with *all* other groups combined, rather than with just *one* other group. Second, to establish whether or not Toronto’s ethnic minorities were more, equally, or less segregated than those in other North American cities, findings for Toronto were compared with data reported by Taeuber (1966). And third, the relationship between each group’s degree of isolation and their representation in special education classes was established by computing the Spearman Rank-Order Correlation Coefficient between segregation index values and percentages in Special A (opportunity, academic vocational, and pre-vocational) classes.

Results

The findings, reported in Tables 1 and 2, reveal three facts about the extent of school segregation. First, the two groups most highly segregated from English-speaking Canadians are the Portuguese (D = 72.8) and the Italians (D = 69.7). Second, both the Greek (D = 44.8) and Chinese (D = 43.8) students are moderately segregated from the English-speaking Canadians. Finally, the index of segregation indicates that, overall, both Portuguese (S = 63.7) and Italian (S = 65.3) students are more segregated from all others than are either the Greek (S = 38.2) or Chinese (S = 46.7) students; English-speaking students (S = 53.4) fall somewhere in between.

When the Toronto results are compared with values reported by Taeuber for cities in the United States, the most apparent feature is the similarity of results. Index values in Toronto ranged from a low of 38.2 to a high to 76.3, with the majority falling between 50 to 70. Excluding blacks,

TABLE 1
DISSIMILARITY INDEX VALUES FOR THE FIVE MAJOR
ETHNIC GROUPS IN TORONTO ELEMENTARY SCHOOLS

	English	Chinese	Greek	Italian	Portuguese
English	-	43.8	44.8	69.7	72.8
Chinese	43.8	-	56.9	76.3	68.6
Greek	44.8	56.9	-	53.9	67.6
Italian	69.7	76.3	53.9	-	63.9
Portuguese	72.8	68.6	67.6	63.9	-

TABLE 2
RANK ORDER CORRELATION BETWEEN SEGREGATION INDEX VALUES
AND PERCENTAGES IN SPECIAL A CLASSES, 1970

Ethnic Group	Segregation Index Value	Percentage in Special A
Greek	38.2	2.06
Chinese	46.7	1.01
English	53.4	4.41
Portuguese	63.7	3.00
Italian	65.3	4.28

$r_s = .60$ $p < .20$

Taeuber's values for D ranged from 37.3 to 76.2, with the majority also between 50 and 70. However, confidence in these conclusions is somewhat weakened by certain differences between the two studies. First, the units of analysis used in Toronto differ from those used by Taeuber. Second, the Toronto study is based on data collected in 1970, whereas Taeuber's data were collected between 1940 and 1960. Third, "The Every Student Survey" based its classification of ethnic group upon language, whereas Taeuber used the race of parents or surname nationality as the criterion. Finally, the Toronto survey considered only the individual child, while Taeuber studied the family unit. The similarity of Lawton's (1972) findings in Detroit to those of Taeuber—though Lawton's methods were similar to those used here—suggests it is reasonable to assume that the effect of these factors is relatively small. Thus, tentative evidence indicates that the pattern of minority group school segregation in Toronto is similar to that in other North American cities.

The Spearman Rank Order Correlation Coefficient between the index of segregation and the percentages in Special A classes equaled .60, for which $p < .20$. The strength of the relationship is not sufficient to confirm the existence of a statistically significant relationship between segregation and academic achievement. Yet, in view of the question's many important social implications, stronger evidence is needed before one can conclude that the relationship does not exist.

Discussion of Findings

The variation in the extent of segregation for the five groups, and in particular the high index values for Italians and Portuguese and low values for Chinese and Greeks, needs some explanation. In the popular view, all groups are considered to be concentrated in ethnic communities, yet the data reveal that the latter two groups are actually less segregated from others than are their English-speaking hosts.

The high Italian and Portuguese index values may be partially explained

by economic factors. Richmond (1970) found that the Mediterranean group, which includes Italy and Portugal, had the lowest level of education of all post-war immigrants into Canada, thereby making it difficult for many members of both groups to find employment in any but unskilled and semi-skilled vocations (Queen's Printer, 1965; Ferguson, 1966; Jansen, 1971). These jobs result in low earnings and make the individual vulnerable to unemployment (Richmond, 1967; Jansen, 1971). It becomes necessary for members of these groups to find inexpensive housing to compensate for their low incomes, thereby limiting them to few residential areas. Heavy concentration of Italian and Portuguese immigrants in particular neighbourhoods is then reflected in school attendance patterns.

The sponsorship system, whereby a Canadian resident ensures that the potential immigrant will not become a public ward, may be another factor which helps to explain heavy concentration of particular ethnic groups. Richmond (1967) believed that the system was particularly important in the case of Italians, since few were eligible for open-placement immigration to Canada which generally requires that an individual will be well-educated and highly skilled. The sponsorship system "strongly [encourages] . . . immigrants to live in the same community and sometimes in the same household as the sponsor (p. 11)." Again, the result is limited geographical areas in which families of Italian origin can find suitable housing.

To help explain the lower Greek and Chinese dissimilarity indexes, it is necessary to examine their respective histories. According to Xenides (1922), the Greeks are noted for placing a high emphasis on education. As a consequence, the second generation usually aspired to the professions (Saloutas, 1964), which in turn, has meant a rapid naturalization of Greek immigrants (Warner and Srole, 1945; Roucek, 1949). Saloutas (1964), in commenting on the rapid integration of the Greek immigrants stated, "The average member of the second generation rarely concerned himself with issues relating to Greece Interest in modern Greek culture was also at a minimum, despite the efforts of the Greek press, church leaders, and influential laymen. The majority of the youth were too absorbed with the American way of life and their own personal problems to give thought to Greek letters and learning (p. 325)." Saloutas continued, "What the Greek Church, the Greek language press and Greek travel agencies wished to encourage . . . the rank and file members of the second generation preferred to avoid. They were in America and it was their country. They just did not care about Greek culture in any of its forms (p. 325)." Much of what Saloutas claims is substantiated in *The Canadian Family Tree* (Queen's Printer, 1967) which notes that the Greek communities in both Montreal and Toronto are no longer closely knit groups but have tended to expand into the wider Canadian society.

Kung (1962) and Lai (1971), in discussing Chinese integration, divided the Chinese population into two factions—the "new immigrants" and the "old immigrants". Lai (1971) noted that the new Chinese immigrants differed greatly from the Chinese immigrants who came to Canada in the nineteenth century. The "new immigrants" came from the cosmopolitan, international city of Hong Kong instead of from agrarian villages in Southern China, and "their life style and attitude to traditional Chinese

values and norms were either in a state of flux or had already been changed before coming to Canada (p. 139)." Whereas the "new immigrants" made their permanent homes in Canada, the earlier Chinese immigrants "hoped to go back to retire in China as soon as they earned enough money (p. 121)." Thus, many of the old Chinese groups cherished their former values, customs and traditions; they had no desire to integrate for fear of losing their cultural identity. On the other hand, the new Chinese immigrants, being more highly educated and having undergone changes due to industrialization and urbanization in Hong Kong, have fitted into the broader Canadian scene. Lai (1971) found that only thirty-four per cent of her sample of new Chinese immigrants settled in Chinese residential areas; the rest were scattered over different parts of Metropolitan Toronto. She concluded that "this new group of Chinese immigrants appears to be more 'at home' in Canadian society than their nineteenth century precursors (p. 139)." Kung (1962) also noticed a disparity between the old and new immigrant groups. He found that although youngsters of the "old immigrant" families still speak Chinese at home and attend Chinese schools after regular school hours, the children of the "new immigrant" families usually speak little Chinese even at home. Kung (1962) attributed his finding to the fact that "most of the 'old immigrants' tend to be more conservative and think it wise and proper to have their children know something about Chinese culture, especially, the Chinese language (p. 57)."

Thus, it appears that many of the Greek immigrants and certain segments of the Chinese population have had a strong desire to integrate and mix with members of the dominant culture. This, no doubt, helps to account for the lower Chinese and Greek dissimilarity indexes.

Conclusions

The results of this study do not imply a need for a sweeping policy to desegregate Toronto's ethnic groups. It appears that both existing ethnic segregation and the uneven enrollment of ethnic groups in special education classes reflect variations in the cultural background of Toronto's public school students. At the same time, the moderate relationship between segregation and enrollment in special education classes does suggest that administrators would be wise to consider ethnic desegregation a desirable objective whenever it is necessary to bus children away from a crowded or antiquated school.

In summary, this study determined that the extent of ethnic segregation in Toronto is similar to that of ethnic groups (other than blacks) in the United States. Italian and Portuguese students are most segregated—and most highly represented in special education classes—while Chinese and Greek students are least segregated—and least represented in special education classes. Both the extent of segregation and enrollment in special education classes appear to be manifestations of many fundamental social, cultural and economic factors.

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An Investigation of Open-Book and Closed-Book Examinations in Mathematics

Differences between examinations set in an open-book setting and a closed-book setting were studied. Student achievement scores were found to be significantly higher on open-book examinations for some sub-scores and total test scores. Students were significantly less anxious in the open-book setting than in the closed-book setting. There was no significant difference between attitude to open-book testing and closed-book testing in this study. However, generally there was a significant relationship between achievement and attitude values but not between anxiety values and achievement. Little difference existed between the values for test variance, reliability and validities between the two settings. (Dr. Kieren is Associate Professor in the Department of Secondary Education, The University of Alberta. Mrs. Michaels is Test and Measurement Consultant, Edmonton Public School Board.)

Evaluation is a critical issue in education today. For an evaluation process to be successful, appropriate means of obtaining or measuring information must be used. The development of such measurement instruments and the selection of appropriate test settings is still lacking for many evaluation processes. This paper is concerned with the effects of test settings on the evaluation process.

The questions that were considered in this study dealt with group examinations written in open-book and closed-book settings. A general definition of an open-book setting is one where textbooks, notes and additional references may be used by the student as he writes the examination. This setting contrasts with the closed-book examination setting where the student is required to answer the questions from memory without the use of any external aids. Some practitioners have long contended that open-book examinations produce higher achievement. They feel that such practice would make examinations a "cinch". At the opposite extreme

others have contended that lower total achievement would result since students would waste time looking up information. For these and other reasons, open-book examinations have not found their way into mathematics teaching practice.

In response to this situation, this study addressed itself to the following specific questions.

1. Do examinations written in an open-book setting, as contrasted with those written in a closed-book setting, provide a different assessment of the high school student's achievement in mathematics? That is, does his achievement differ between the two settings?
2. Does a student's level of anxiety differ in the two settings?
3. Does a student's attitude to the two settings differ?
4. Is there a relationship among attitude, anxiety and achievement in a particular setting?
5. Does the reliability, validity and variance of examinations vary between the two settings?

Findings from the Literature

Group examinations, written in an open-book setting, have been used sporadically over the years in North America. Stalnaker and Stalnaker (1934) published an article on a three hour open-book examination at the University of Chicago. Additional studies have been completed on university populations since that time (Tussing, 1951; Furst, 1958; Kalish, 1958; Feldhusen, 1961; Marco, 1966). Major findings resulting from the investigations of these individuals were:

1. No change or a slight increase in achievement resulted when open-book examinations were administered. (Kalish, 1958; Feldhusen, 1961; Marco, 1966)
2. Students liked open-book examinations better. A possible reason given is that they were less anxious. (Tussing, 1951; Feldhusen, 1961; Marco, 1966)
3. Sounder study preparation resulted when open-book examinations were administered. (Tussing, 1951; Furst, 1958; Feldhusen, 1961)
4. Different abilities were tested in the open-book examination. Students were not tested on memory only, but also on reasoning. (Tussing, 1951; Furst, 1958; Kalish, 1958; Feldhusen, 1961)
5. Slight increases in validity, variance and reliability values were found in open-book set examinations over closed-book set examinations. (Marco, 1966)

Implications from these findings for the current study can be made only tenuously. None of the studies considered dealt with secondary school students and most were based on the author's reactions as a teacher using a particular examination type. Both of these limitations are suggestive of the need to conduct the type of study described here.

Research Design

The present study involved over 600 Mathematics 30 students, selected on a sampling basis from the province of Alberta at the grade XII level.

The students were randomly assigned to four groups by classroom lot. All participating classrooms were heterogeneous and contained a random sample of Mathematics 30 students in their school. Each group had a different order of setting and test forms to prevent any systematic differences occurring because of order of administration. The following data were collected for each student.

- (a) open-book test score
- (b) closed-book test score
- (c) neutral, open and closed anxiety scores
- (d) open and closed attitude scores to testing
- (e) attitude to mathematics score

The "anxiety scales" (Marco, 1966) were administered in a neutral setting not involving testing and then immediately prior to each of the test settings. The "attitude to testing" scales were administered immediately after each of the test settings. The "attitude to mathematics" scale was administered in a neutral setting between the two testing sessions. The two testing sessions were approximately one week apart.

Both tests the students wrote were parallel and contained 36 items. The thought levels represented in the items were knowledge, comprehension and application (Ayital and Shettleworth, 1968).

It should be noted that this study does not seek to explore the parameters of an ideal open-book test. The open-book setting here is a very conservative one—that is, the test is a multiple choice examination designed for closed-book testing. If the data show differences in achievement attributable to test setting, since in this instance the variation in test setting is minimal, it could be concluded that using test instruments more appropriate to the open-book setting would produce still greater differences.

Results

Total test statistics such as variance, reliability and validity were considered in this study. Results showed no significant differences between the two test settings. For example, comparison of total test reliabilities showed that they did not differ by more than .05 between the Spearman-Brown "*r*'s" for the two settings. Thus, this study has shown the two settings to produce examinations of similar variance, reliability and validity.

The effects on achievement due to settings was analyzed using a three-way analysis of variance. This analysis considered the relationship of student achievement to the time of administration, setting and test form. It was found that there was no interaction between time of administration and setting or test form and setting. Hence, it is instructive to look at the main effect of the setting as indicated in Table 1.

A significant difference existed in all cases except for the Application sub-test. A number of possible explanations could be given. First, the students may have found the application questions too complex or unrelated to specific details in their notes or textbooks to receive significant help when they were writing the open-book examinations within the time given. Thus, the application section may have been effectively closed-book in either instance. Second, the very nature of application questions

TABLE 1
MAIN EFFECTS OF EXAMINATION SETTINGS

Effects	Knowledge Items	Comprehension Items	Application Items	Total Test Items
Setting				
Open	73.79	64.80	56.62	62.43
Closed	65.27*	61.64*	56.78	60.03*

*Significant at $p = .05$

indicates the student normally is not able to find the ready-made answers in his notes. The student is required to apply what he knows to a new situation.

Each testing period, the students filled out the Anxiety Differential with responses indicating their feelings about the approaching test they would write. The anxiety scale mean scores for the three times are indicated in Table 2. Student test anxiety was highest for students before writing a closed-book set examination and lowest in the neutral setting. Pairwise analysis of these means showed them to all be significantly different from one another, each with $p = .05$.

TABLE 2
COMPARISON OF ANXIETY SCALE MEANS

Setting	Mean
Neutral	45.368
Open	48.019
Closed	49.376

When the attitudes to open- and closed-book examinations were compared, no significant differences were found. The data for the comparison are given in Table 3. It appears that the student who has a favourable attitude to one test setting also has a favourable attitude to the other test setting.

TABLE 3
COMPARISON OF OPEN AND CLOSED-BOOK
ATTITUDES TO TESTING

Source of Variation	SS	DF	MS	F-ratio
Between People	280,911.0	451	622.862	
Within People	33,313.0	452	73.701	
Treatment	28.0	1	28.000	0.379
Residual	33,285.0	451	73.803	
TOTAL	314,224.0	903		

$p = .05$ $n = 452$

A series of regression equations were structured to determine the relationship of achievement to the attitude and anxiety variables. The equations showed that the attitude variables—attitude to open-book testing, attitude to closed-book testing and attitude to mathematics—were significantly related to achievement. Anxiety variables did not contribute any added prediction value to the regression equations. The variables listed in Table 4 represent most of the accounted for total test variance.

TABLE 4
USEFUL VARIABLES FOR PREDICTING ACHIEVEMENT

	Form A (Open)	Form A (Closed)	Form B (Open)	Form B (Closed)
Percent Variance of Total Test Accounted	29.79%	12.87%	16.18%	23.89%
Significant Variables on Total Test	Math Attitude Open-Book Attitude	Closed-Book Attitude	Math Attitude	Math Attitude
p = .05				

The primary results of the study can be summarized as follows:

- (a) Achievement scores were significantly higher on open-book examinations for knowledge item, comprehension item and total test item scores. No significant differences were found for application item scores.
- (b) The students were significantly more anxious in a test situation (either open- or closed-setting) than in the neutral setting. They were significantly less anxious in the open-book setting than in the closed-book setting.
- (c) There was no significant difference between attitude to open-book testing and closed-book testing.
- (d) There was a significant direct relationship between achievement and attitude values but no relationship between anxiety values and achievement.
- (e) Little difference existed between the values for test variance, reliability and validities between the two settings.

Implications

There are several implications for practice which can be drawn from this study of the simple effect of allowing students to write open-book examinations. Let us consider the three major areas, achievement, anxiety, and attitude.

The data seem to indicate that the open-book setting will increase achievement as measured by test score. Thus, if one wishes to allow his

students a greater measure of success, an open-book test composed of mainly knowledge and comprehension thought level items would be valid. However, if the test was on objectives requiring the mathematical process of application, either an open or closed-book setting would be appropriate since there would be no significant difference in achievement.

Many studies on achievement of various types note an optimal level of anxiety as productive of the best achievement. The closed-book setting resulted in the highest level of anxiety. This study indicates that an open-book setting results in a small but significant reduction in anxiety than does the closed-book examination. This open-book anxiety mean was, however, significantly greater than the neutral setting mean anxiety score for students. While much further and specific study needs to be done, these data are suggestive of an hypothesis that open-book settings can be conducive to a more nearly optimal level of anxiety or stress.

There is some evidence in the data to suggest that one's attitude to the type of examination is predictive of one's achievement on the examination. This finding may be a simple artifact of the students' ignorance of open-book examinations. However, if these data are supported by subsequent findings, this would indicate that the implications above with respect to achievement and anxiety could not be applied universally. That is, one might expect to find individualized reactions to open-book examinations in terms of achievement, with different individuals achieving best in different settings. With the increase in individualized programs, different ways of evaluating a unit of work should be open to the student.

Should mathematics teachers use open-book examinations? The data above suggest that such examinations are a legitimate and sometimes preferable alternative to most current practice in Alberta secondary school mathematics. How can they be used most effectively? What are the best forms of open-book examinations? These are questions left for further research: "action research" of mathematics teachers and students in classrooms, and research on variations of the open-book setting and other measures of achievement, attitude and stress.

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Personality Characteristics of Male and Female Prospective Teachers: A Multivariate Analysis

The primary purpose of this study is to test the multivariate null hypothesis that the personality characteristics of three groups of prospective teachers—female elementary, female secondary, and male secondary—do not differ. The dependent variables actually consisted of two sets; nine variables derived from Rogerian personality theory and twelve variables which measure Jungian type characteristics. Ss were 365 juniors and seniors in a large state university in the southwest region of the United States. Multiple discriminant analysis of the data results in rejection of the null hypothesis for the Rogerian based personality characteristics. When the Jungian type characteristics constitute the dependent variables, the results are equivocal. (Dr. Richek is Associate Professor at the School of Social Work, University of Oklahoma.)

That the teacher/child relationship is a crucial one from the point of view of the affective and cognitive growth of the child appears to be universally accepted (Peck and Richek, 1967). Sexton (1969) recently re-introduced the hoary issue of sex of the teacher; in her opinion, "more virile males . . ." (p. 193) are needed as teachers—at all levels—to counteract an alleged "feminizing" influence on American youth of female teachers. The Sexton (1969) book apparently pays no heed to the findings on this issue of Ryans' (1961) monumental work viz *that in the elementary schools there are essentially no differences in "productive" pupil behaviors* whether the teacher is male or female. However, at the secondary school level "productive" pupil behaviors are more evident when the teacher is female (Ryans, 1960).

Since this paper does *not* relate to the differential impact on the teacher-child relationship of the sex of the teacher or child, the review of the literature on this issue must perforce be truncated. The primary purpose of this paper is to test—using multiple discriminant analysis—the ". . . generalized, multivariate null hypothesis . . ." (Cooley and Lohnes, 1962, p. 119) that three groups of prospective teachers—female elementary, female secondary, and male secondary do *not* differ on two sets of personality

variables¹—one set derived from Carl Rogers' theory of personality (Rogers, 1959) and the other from C. G. Jung (1923).

Methods and Procedures

Instruments

In a southwestern university in the U.S., students who seek teaching certificates are required to complete a personality assessment packet at the point of declaring their intention to seek teacher certification, which generally is at the beginning of the junior year of college. This practice is in accord with the early personality screening requirements instituted by a large number of teacher training institutions (Miller, 1963). Among the evaluative instruments included in the packet at the time the data for this study were collected were:

A. *The Bown Self-Report Inventory (SRI)*. The SRI is designed as a straightforward self-assessment instrument in which subjects can record their own perceptions and feelings toward themselves and significant areas of their phenomenal worlds. In contrast to many other self-descriptive instruments which are constructed in such a way that an index of self-acceptance or, at most, indexes of acceptance of self and others are the only scores obtainable, the SRI yields multiple scores representing positiveness of attitude toward various segments of the phenomenal world. The theoretical background of the instrument is Rogerian: the central construct is that human behavior is determined by an individual's perceptions of the self and of the situation in which the individual is involved and his relations to significant others and to his environment. These form a configuration known as the phenomenal self.

A more detailed description of the SRI, including a summary of reliability and validity data, appears elsewhere (Bown and Richek, 1967). A brief statement of the scale descriptions follows: the SRI (Form R3) is made up of 48 items representing eight logically distinct areas of the "phenomenal world." These are:

1. *Self*. Items express acceptance, liking, or valuing of oneself—or the opposite.
2. *Others*. Items express acceptance, liking, or valuing of peers of the importance of satisfactory relationship with peers to one's own sense of well-being—or the opposite.
3. *Children*. Items express acceptance, liking, or valuing of children or the satisfaction derived by the subject in relationships with children—or the opposite.
4. *Authority*. Items express acceptance, liking, or valuing of older persons outside the family who are in positions of authority with respect to the subject—or the opposite.
5. *Work*. Items express a valuing of work or accomplishment in terms of its intrinsic or self-enhancing satisfaction to the subject—or the opposite.

¹ If the writer may be permitted to express a *personal opinion*, it is that far more important than the sex of the teacher are the teacher's personality characteristics, especially those which conduce toward acceptance and valuing of children on all dimensions—affective, cognitive, conative.

6. *Reality*. Items express acceptance or valuing of life as a process (including death) and feeling at home in and relatively comfortable with a not always predictable world—or the opposite.
7. *Parents*. Items express acceptance, liking, or valuing of one's own parents or the importance of one's relationship with parents to his own sense of well-being—or the opposite.
8. *Hope*. Items express an optimistic anticipation of the future or a sense of confidence that one will play a significant and satisfying role in future relationships and undertakings—or the opposite.
9. *Total*. The sum of all subscores which may be construed as the positiveness of the respondent's perceptions of his phenomenal world.

Subjects respond to each item by indicating on a five-point scale (running from "very much like me" to "very much unlike me") the extent to which the item expressed their own feelings and attitudes. The inventory yields eight subscores representing positiveness of attitude in each area and a total score (the sum of all subscores).

- B. *The Myers-Briggs Type Indicator (MBTI)*. (Myers, 1962.) The MBTI yields eight scores which provide measures of Jung's (1923) typology

1. Extroversion
 2. Sensing
 3. Thinking
 4. Judging
 5. Introversion
 6. Intuition
 7. Feeling
 8. Perceiving
- and four so-called "continuous scores"
9. Extroversion/Introversion
 10. Sensing/Intuition
 11. Thinking/Feeling
 12. Judging/Perceiving.

Subjects and Statistical Techniques

Scores on the SRI and MBTI variables were available on 70 males (all seeking secondary school certification), 65 female elementary education majors, and 300 female prospective secondary school teachers. There were no significant differences among the three groups on any important demographic variables, e.g., age, socioeconomic status, etc. Data were analyzed via the computer program for multiple discriminant analysis described by Veldman (1967, pp. 268-279). Briefly stated, multiple discriminant analysis is a statistical technique whereby two (or more) groups of Ss "... may be differentiated by a set of dependent variables operating together . . ." (Veldman, 1967, p. 68). In this paper, the three groups were compared for two separate sets of dependent variables: (1) the nine SRI variables and (2) the twelve MBTI variables. The multiple discriminant

analysis program also compares univariate analyses of variance for each of the original variables (nine for the SRI and twelve for the MBTI).

Results and Discussion

TABLE 1
F RATIOS FOR THREE GROUPS

Variable	Means			SD			F ratio
	Sec. Fem. (N=300)	Elem. Fem. (N=65)	Males (N=70)	Sec. Fem. (N=300)	Elem. Fem. (N=65)	Males (N=70)	
<u>SRI</u>							
Self	19.43	20.45	19.09	3.86	4.07	3.36	2.45
Others	20.19	21.55	19.33	2.92	2.13	2.82	10.92
Children	17.30	21.99	16.06	4.52	2.42	4.77	38.22
Authority	18.63	19.59	17.77	3.27	3.16	3.13	5.32
Work	16.77	16.91	15.79	3.79	3.28	3.93	NS
Reality	16.71	16.66	15.79	3.35	3.34	2.76	2.34
Parents	18.76	20.06	18.34	5.24	5.22	5.16	NS
Hope	20.16	21.35	20.11	2.83	2.48	2.93	5.10
Total	147.95	158.55	142.27	17.39	16.41	17.27	15.78
<u>MBTI</u>							
Extraversion	14.97	17.48	15.19	6.48	6.32	6.73	4.02
Sensation	13.24	13.40	14.13	7.69	7.16	7.90	NS
Thinking	7.49	8.38	10.39	4.95	5.74	5.23	9.19
Judging	16.15	18.08	17.44	6.36	6.16	6.47	3.12
Introversion	3.09	3.65	6.26	6.21	6.17	8.12	6.63
Intuition	10.86	10.11	10.19	6.28	5.54	6.37	NS
Feeling	12.65	12.06	9.36	4.81	5.33	5.27	12.48
Perception	10.48	8.52	9.05	6.35	5.91	6.64	3.40
E/I	93.57	83.86	91.77	25.99	25.35	26.80	3.72
S/N	96.25	94.42	93.11	26.96	25.35	27.59	NS
T/F	111.31	108.35	96.94	18.72	20.90	20.41	15.67
J/P	89.66	81.89	84.23	24.95	23.89	25.86	3.36

F ratios greater than 3.12 are significant at the 5% level.

F ratios greater than 5.10 are significant at the 1% level.

Univariate Analysis

In Table 1 are shown the results of the single classification analyses of variance for three groups on the SRI variables and the MBTI variables. The contents of Table 1 are shown primarily for information purposes; hence, discussion will be limited. The data in Table 1 were not submitted to the Scheffé method since the focus of this investigation is on multivariate analysis. However, *t* tests were done (these are not tabled) comparing male secondary and female secondary groups. Results indicated that the two groups differed on six of the nine SRI variables with *all* differences in favor of the female group; i.e., their perceptions of their phenomenal worlds were more positive than were the perceptions of the males. On the MBTI variables, the *t* tests between female secondary and male secondary Ss revealed statistically significant differences on the thinking/feeling functions. The MBTI manual (Myers, 1962) provides data indicating that generally males are more "thinking" and less "feeling" than are females; our finding is therefore in accord with previous research. Comparison of the secondary male and female Ss on the MBTI introversion variable revealed that the males were more "introverted" ($t = 3.06, p < .01$).

Multivariate Analyses: SRI

TABLE 2

MALE AND FEMALE PROSPECTIVE TEACHERS
DISCRIMINANT ANALYSIS: SRI VARIABLES
CORRELATIONS WITH DISCRIMINANT FUNCTIONS

<u>Variables SRI</u>	
Self	.25
Others	.54
Children	.97
Authority	.37
Work	.16
Reality	.12
Parents	.20
Hope	.40
Total	.64

90% of trace extracted by one root: Wilks Lambda = .834.
F = 4.48, $p < .0001$

Root 1 accounted for 100 percent of the variance

$\chi^2 = 77.87, df = 10, p < .0001$

<u>Group Centroids</u>	
Male Secondary (N=70)	3.24
Female Secondary (N=300)	3.46
Female Elementary (N=65)	4.31

In Table 2 are shown the results of the discriminant analysis when the dependent variables are those yielded by the SRI. The centroids (multivariate means) of the two secondary groups are quite similar (3.24 for

male secondary and 3.46 for female secondary) but both differ from the female elementary multivariate mean (4.31). There emerged one highly significant discriminant function ($x^2 = 77.87$, $df = 10$, $p < .0001$) which accounted for 100 percent of the variance. It may be concluded that the multivariate null hypothesis is rejected *vis-a-vis* the SRI variables; i. e., the three groups may be separated on the nine SRI variables with prospective secondary school teachers—regardless of sex—differing from prospective female elementary school teachers.

The correlations between the nine SRI dependent variables and the discriminant function yield in this instance little information additional to that which is available from the univariate analyses (see Table 1). The SRI variables of *Work*, *Reality*, and *Parents* are low order predictor variables of group membership (prospective elementary versus prospective secondary school teachers) while the SRI variables—*Others*, *Total*, and especially *Children*—are seen to be powerful predictors of group classification. (The caveat of Overall and Klett, 1972, p. 92, regarding the nature of the discriminant function need not be heeded in this instance—the units of measurement of all SRI scales are identical.)

Multivariate Analyses: MBTI Variables

TABLE 3
MALE AND FEMALE PROSPECTIVE TEACHERS
DISCRIMINANT ANALYSIS - MBTI

Variables (MBTI)	Correlations With Discriminant Function #1	Correlations With Discriminant Function #2
Extroversion	.01	.05
Sensation	-.10	.46
Thinking	-.19	-.55
Judging	.00	-.59
Introversion	-.18	-.38
Intuition	.08	-.42
Feeling	.24	.59
Perception	.01	.59
E/I	.00	-.02
S/N	.10	-.46
T/F	.27	.59
J/P	.01	.60

Chi square for Roots #1 and #2 highly significant. Root #1 accounted for 95% of variance. Root #2 accounted for 5% of the variance.

Group Centroids

	Discriminant Function #1	Discriminant Function #2
Male Secondary (N=70)	2.61	-12.73
Female Secondary (N=300)	2.67	-12.71
Female Elementary (N=65)	2.67	-12.73

When the multiple discriminant statistical technique is utilized with the MBTI variables, the two female groups are found to have virtually identical group centroids on the first discriminant function (which accounts for 95 percent of the variance); however, the male group centroid is not too far removed from the females. In this analysis, a second discriminant function was extracted (accounting for 5 percent of the variance). While the three group centroids are almost identical, it is only with respect to this second discriminant function that the multivariate analysis yields information on the contribution of the *Sensing* and *Intuition* variables of the MBTI. Thus it will be noted that in the univariate analyses (see Table 1) there were *no* significant differences among the three groups on the Sensing, Intuition, or the S/N means. However, as will be seen from Table 3, the Sensing and Intuition scores do load significantly the second discriminant function. Actually, except for the Thinking and Feeling variables, none of the MBTI variables appear to contribute meaningfully to the first discriminant function. Note, however, the loading of all the MBTI variables (except *extroversion* and *introversion*) on the second discriminant function.

Conclusions

It would seem injudicious on the basis of one sample (albeit a respectably large one) to conclude definitively that the teaching level (elementary or secondary) to which prospective teachers aspire is more closely associated with a set of Rogerian-derived personality characteristics than is the sex of the prospective teacher. Yet the SRI data (Tables 1 and 2) do support such a conclusion, although cross-validation is in order. For a set of Jungian-derived personality characteristics (the MBTI variables) multiple discriminant analysis indicates that it is sex of prospective teachers rather than teaching level which the MBTI scores predict, although this statement apparently holds only for the first discriminant function but a function which accounts for 95 percent of the variance. On a second discriminant function (five percent of the variance), the multivariate means of the three groups are so close as to make interpretation difficult. In general it would seem that female prospective secondary school teachers are closer in their Jungian type profiles to female elementary school teachers than they are to male secondary school teachers.

Finally, it is believed that the findings of this investigation are concordant with those contained within a vast corpus of research writings on the relationships of teacher personality characteristics to level of teaching (see Peck and Richek, 1967, for a review of the literature).

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Role of Conceptual Tempo in Concept Formation

A sample of grade pupils were classified as impulsive or reflective on the basis of their performance on a Matching Familiar Figure Test. These two groups were then compared on a test of conservation of length and on a test of mathematics achievement. Differences were found on the conservation of length test and on the part of the mathematics achievement test which dealt with the recall of basic facts. The results for both of these variables favored the subjects classified as reflective. (Dr. Cathcart is Associate Professor in the Department of Elementary Education, The University of Alberta.)

Introduction

When young children are faced with tasks or activities for which they must choose among a number of alternative responses, some of them will find it somehow impossible to consider all of the alternatives before committing themselves. They respond quickly and often incorrectly. Other pupils appear to be more cautious and they will delay their responses until they have considered various alternatives. The latter children seem to have a longer attention span and they make fewer mistakes. These differences in conceptual tempo have been used by Kagan (1965) in his work with children. He showed them a picture (standard) and asked them to find one that is most like the standard from among six other pictures. The response time and the number of mistakes made by each child were used to identify them as either impulsive (fast) or reflective (slow).

Kagan (1963) found that differences in conceptual tempo may exist even if children are of equal intelligence and that "an individual's preferred conceptual strategy is implicated in a variety of behaviors (p. 109)." Although the capability of being reflective tends to increase with age, an

individual's conceptual strategy remains the preferred mode over a number of years.

There exists some evidence that reflective and impulsive individuals differ in their ability to learn and acquire concepts. Kagan (1963) discovered that reflective children seem to have an advantage over impulsive children when such reading skills as word recognition and word recall are considered. Cathcart and Liedtke (1969) sampled some pupils from grades 2 and 3, classified them according to conceptual tempo and administered a mathematics achievement test. The results suggested that students who achieve best in mathematics are those who are more reflective. Callahan and Passi (1971) explored the relationship between conceptual tempo and the ability to conserve length. They used subjects from kindergarten and grade one, administered two conservation items, and reported that although there was a tendency for reflective children to be better able to conserve length, the relationship did not reach statistical significance.

Piaget (1960) has provided us with detailed examples of how children reach an understanding of length. Numerous ingenious experiments illustrate the stages children pass through before they reach the stage of conservation (or the developmental stage which brings with it the realization that the length of an object does not change as the object passes through certain transformations). He concludes that

The idea of necessary conservation, which entails the complete coordination of operations of subdivision and order or change in position, is accomplished at stage III. This stage was found to have been reached by one in ten in the age range 6-7, by half of those 7-7½, and three-quarters of those 7½-8½ years old. (Piaget, 1960, p. 114).

The main purpose of this study was to select some 7½ to 8 year old subjects and to determine if there was a difference between those classified as impulsive and those classified as reflective in their ability to conserve length. Other variables investigated for possible relationships with conceptual tempo included mathematics achievement and intelligence.

Research Design

Sample

The sample consisted of 59 grade two pupils. Twenty-four of these attended a school in Edmonton, Alberta and the remaining subjects represent the grade two population of a school in the outskirts of Victoria, British Columbia.

Instruments

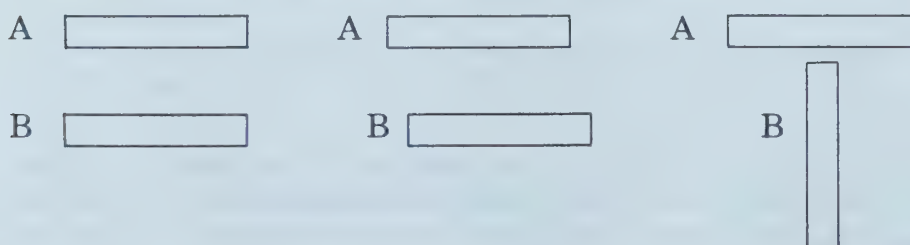
Kagan developed the "Matching Familiar Figures" (MFF) test which can be used to identify subjects as impulsive or reflective. Each item on this test consists of pictures on two 8½ x 11 inch sheets of paper. On one page a picture is presented as a standard. Another page contains six pictures similar to the standard. However, only one of the six is exactly like the standard and the subjects are asked to find that one. Two practice and six items from the MFF test were used for this study and the responses

were timed to the nearest half second and a record was kept of each response until the correct answer was given.

In the present study a median split was used to classify subjects as impulsive or reflective. Subjects who scored below the median time of 14 seconds and above the median number of errors of 1.4 were classified as impulsive. Children above the median in time and below the median in errors were classified as reflective. This procedure identified 20 reflective subjects, 22 impulsive and 17 subjects could not be classified as either impulsive or reflective. The mean age for the reflective subjects was 93.6 months compared to 94.6 months for the impulsive pupils.

While the median split procedure is a common method of classifying subjects as impulsive or reflective there seems to be some variation in the medians reported in different studies. For a sample of 92 second grade pupils Kagan (1965) reported a median response time of 12.1 seconds per item and a median of 1.1 errors per item. Cathcart and Liedtke (1969) found a median response time of 15.8 seconds and a median of 1.2 errors for a sample of 46 grade two and 12 grade three children. It is difficult to make a comparison with Callahan and Passi's (1971) study because they reported means rather than medians even though they used a median split to determine impulsive and reflective subjects. Furthermore their study was conducted with kindergarten and grade one subjects.

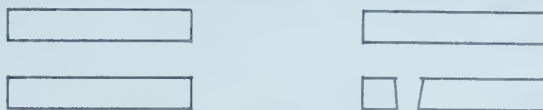
The conservation of length test consisted of ten items. Various objects and arrangements were presented. For each item the subject was faced with two arrangements and he was asked whether one was longer than the other, vice versa, or whether they were both the same length. For items one to three a stick (10 inches) and a string (15 inches) were used. In item one the endpoints were coterminous, for item two the string was extended, and finally in third item the string was reduced to its original position. The second of these arrangements was not marked. For items four to six two four-inch Cuisenaire rods were used. The following transformations were presented in the sequence shown. After the subjects had agreed that A and B were the same length, the following questions were asked each



time. "Tell me _____ (name of subject), is this one longer (pointing to A), is this one longer (B), or are they the same length?" A similar procedure was used for items seven to nine where the subjects faced twelve toothpicks and the following sequence of transformations:



For the last arrangement, one toothpick was broken. Two paper strips (10" x ½") and a similar procedure were used for questions ten and eleven.



For the last question, one of the strips was cut.

A mathematics achievement test consisting of 31 items was developed. Fifteen of these items were in multiple choice form and they were designed to measure understanding of mathematical concepts and their application. There were six verbal problems and ten questions on basic facts. Many of the items were taken directly from the textbook the pupils were using as part of their mathematics program (Hartung, 1965).

The mathematics achievement test yielded four scores. The first 15 multiple choice items composed the first subtest which was called "Concepts." The six verbal problems yielded a measure of problem solving ability. (Only the correct answer was scored). The 10 questions on basic facts enabled the calculation of a score on "Basic Facts." The total score was the sum of the scores on the above subtests.

The Kuder-Richardson reliability for the total test was 0.632. Reliability coefficients for the subtests were as follows: Concepts, 0.589; Problem Solving, 0.726; Basic Facts, 0.645.

To obtain a measure of intelligence the Otis Quick-Scoring Mental Ability Test (Alpha) was used. This test consists entirely of pictures and designs. Since it includes a verbal and non-verbal part, three scores were obtained. Reliability coefficients reported in the manual (based on 495 cases) of the non-verbal and verbal tests are .68 and .71 respectively. The reliability for the whole test is .81.

Results

When the subjects were subdivided by both sex and conceptual tempo the distribution in Table 1 resulted.

TABLE 1
RELATIONSHIP BETWEEN SEX AND CONCEPTUAL TEMPO

	Reflective	Impulsive
Male	8	16
Female	12	6

$$\chi^2 = 4.582$$

$$p = .032$$

The above distribution indicates that for the subjects in this sample, more girls tended to be reflective and more boys impulsive. Perhaps girls are more mature at this age level and if reflectiveness is a factor of maturity as Kagan (1963) seems to imply, then this result is as one would expect.

Three intelligence scores (verbal, non-verbal and total IQ) were obtained from the Otis Quick-Scoring Mental Ability Test (Alpha). A t-test was used to compare the reflective and impulsive students on these three measures. The results are summarized in Table 2.

TABLE 2
COMPARISON OF REFLECTIVE AND IMPULSIVE SUBJECTS ON INTELLIGENCE

IQ Measure	Means		St. Deviations		DF	t	p
	Reflective	Impulsive	Reflective	Impulsive			
Verbal	102.85	97.45	11.64	11.37	40	1.519	.137
Non-verbal	114.00	104.18	13.15	11.73	40	2.557	.014
Total	108.70	100.09	13.12	12.64	40	2.165	.036

These results show that reflective children in the sample obtained higher scores on the intelligence test than the impulsive subjects. Perhaps the characteristic of being able to weigh various alternatives before replying to a task and not responding quickly without such consideration is responsible for these differences in intelligence results.

The higher IQ score of reflective subjects coupled with the finding that more girls tended to be reflective than boys suggests the possibility of an interaction effect. The interaction between sex and conceptual tempo on each of the three IQ measures was tested using a method outlined by Winer (1962). There was no significant interaction on any of the IQ measures, the lowest probability being greater than 0.6.

Conceptual Tempo and Mathematics Achievement

One of the major purposes of the present study was to determine if a difference existed between impulsive and reflective pupils in their achievement in mathematics. To test the foregoing problem sex was used as a blocking variable since it was found to be significantly related to conceptual tempo and IQ was used as a covariate since reflective and impulsive subjects differed significantly in their mean IQ score. The two-way analysis of covariance procedure outlined by Cooley and Lohnes (1962) was followed. In order to obtain proportionality between cells across rows and columns six of the 16 impulsive males and eight of the 12 reflective females were randomly selected to represent their respective cells. (Refer to Table 1).

The adjusted means, F ratio with 1 and 23 degrees of freedom and the probability of the F ratio for each of the four scores obtained from the mathematics achievement test are presented in Table 3.

The interaction between sex and conceptual tempo was investigated for each of the criterion measures but none of the interaction effects approached significance. The lowest probability associated with interaction was 0.15 on the total test score.

When the subjects of the mathematics achievement test were considered, the adjusted means for the reflective subjects were higher than

TABLE 3
ANALYSIS OF COVARIANCE BETWEEN GROUPS ON
MATHEMATICS ACHIEVEMENT (COVARIATE = IQ)

Group	Mathematics Achievement Test			
	Concepts	Problem Solving	Basic Facts	Total
Reflective	7.32*	1.48*	7.96*	16.75*
Impulsive	7.75*	1.03*	6.06*	14.83*
F _(1,23)	.28	.65	6.20	1.70
Probability	.39	.43	.02	.20

*Adjusted means

the adjusted means for the impulsive subjects on the parts of the test which dealt with problem solving and the recall of basic facts. Only the latter difference in means was statistically significant. On the subtest dealing with concepts, the adjusted mean for the impulsive subjects was higher than the adjusted mean for the reflective subjects. However, this difference in means was not significant.

Conceptual Tempo and Conservation of Length

The usual Piagetian test item involves a degree of uncertainty for the subject, especially for non-conservers or for subjects in a transitional stage between non-conservation and conservation. It was hypothesized, therefore, that a relationship exists between conceptual tempo and conservation. On a test of conservation of length the mean for reflective subjects would be different from the mean for subjects classified as impulsive. The corresponding null hypothesis was tested with a two-way analysis of covariance where sex formed the second blocking variable and IQ was the covariate. This analysis was carried out in conjunction with the analysis of the mathematics achievement test. Table 4 contains a summary of the

TABLE 4
ANALYSIS OF COVARIANCE BETWEEN GROUPS ON
CONSERVATION OF LENGTH (COVARIATE = IQ)

Source	SS	DF	MS	F	P
Conceptual Tempo	29.99	1	29.99	4.46	.04
Sex	9.95	1	9.95	1.48	.23
Tempo X Sex	0.02	1	0.02	0.003	.09
Within	154.59	23	6.72		
Total	194.55	26			

analysis. The adjusted means were 7.61 and 5.51 for the reflective and impulsive subjects respectively.

For the sample in this study the mean for the reflective subjects was significantly higher than the mean for the impulsive subjects. This could imply that reflective children conserve length before impulsive children do.

Summary and Discussion

The major purpose of the study was to examine the relationship of conceptual tempo to mathematics achievement and to the acquisition of conservation of length. With respect to achievement in mathematics, the reflective subjects outperformed the impulsive children only in their ability to recall basic facts. One's first reaction is that this is an area where differences should be least pronounced since memorization of facts should be as easy or as well established for the impulsive child as it is for the reflective one. However, in the testing situation various approaches for arriving at and recording the answer to unfamiliar questions were observed. Before recording their answer some children used various aids such as their fingers or a large number line at the front of the classroom. Others seemed to simply write down the first answer which came to mind without giving it a second thought. Perhaps the children who used aids were the reflective children. They took the time to work out the problem from their knowledge of the numeration system, whereas others simply guessed at the answer or even omitted the questions involving facts which were unfamiliar to them. This difference in conceptual tempo or cognitive strategy could have accounted for the difference in performance. If this conjecture is true important implications for evaluating pupils in an elementary mathematics class arise. To evaluate impulsive pupils fairly they could be faced with a situation where they must either know the facts or where they must use an aid of some kind to arrive at an answer. Observing them in a setting where more than the recording of an answer is required, such as in a game situation may be one useful approach.

It seems that for the sample used in this study, reflective children conserve length before the impulsive children. Piaget (1960), rather vividly, demonstrated the fact that the formation of a concept is a slow, developmental process. Conceptual thought gradually appears and develops during the pre-operational period. However, basic concepts are organized into coherent systems once the child has reached the concrete operational stage. One of the most important components of the transition from pre-operational to concrete operational thought is the acquisition of various conservations. If the results of this study are true for the conservation of other properties this would have important implications for those who teach in the primary grades.

The tendency for reflective subjects to be superior to impulsive children in conservation of length was also observed by Callahan and Passi (1971).

If reflective children score higher on intelligence tests than impulsive pupils because they take more time to weigh alternatives before they respond then there exists another reason for questioning the validity of an intelligence test. The question "what does it measure?" seems to have added meaning when considered in the light of the results reported here.

Since sex was used as a blocking variable in this study it was possible to look at sex differences on conservation of length and on each of the four mathematics achievement scores. No significant differences were found. However, sex was significantly related to conceptual tempo. This was explained in terms of maturational differences.

Each teacher is aware of individual differences which exist in the classroom. Differences among pupils are usually explained on the basis of such factors as mental age, motivation, personality, and/or socio-economic status. More attention could be paid to conceptual tempo as a factor contributing to individual differences. The little boy at the back of the room who seems slow in responding to a task may be just as "intelligent" as his classmates. His hesitation may be due to his reflectivity. On the other hand, impulsive child may report only the first answer which comes to mind. If this response is incorrect only further examination will tell whether the child did or did not know the correct answer.

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Part-Time Teachers of Adults

There is ample evidence that a substantial number of elementary or secondary school trained teachers are teaching adults on a part-time basis. It was with a view to learning more about this particular group of teachers that this study was undertaken. The study was interested in finding out why these teachers came into adult education, why they remained teaching in this field, and whether the teachers perceived particular problems within their capacity as teachers of adults, as compared with teaching children and youth.

Findings indicate that these part-time teachers of adults know very little about the resources and literature of adult education, but that they enjoy the stimulation which comes from exposure to highly motivated adults. In their opinion, teaching adults has had an impact on their effectiveness as daytime teachers in the elementary and secondary school systems. The study provides data of immediate practical value to those responsible for both the initial training and the continuing education of teachers. (Dr. Draper is Associate Professor in the Department of Adult Education, Ontario Institute for Studies in Education).

Statement of the Problem

An examination of numerous school employment records indicates that upwards of 12% of the total elementary and secondary school teacher population become involved at some time in their career with the part-time teaching of adults. When one transfers this into actual numbers, the size of this group is considerable.

In spite of the large number of teachers who are working with adults on a part-time basis, surprisingly little is known about them with respect to their attitudes and reasons why they are working with this older age group, many of them eventually coming into adult education on a full-time basis.

Two further trends occurring in Canadian society seem to have direct

bearing on adult education. One is the increase in the educational opportunities becoming available for the young and older adult populations. This trend has obvious implications for the greater number of teachers of adults which will be required. Many of these will continue to be teachers who have been trained as elementary or secondary school teachers. The trend here is toward teachers working with a greater variety of age groups throughout their professional career.

A second trend involves a re-thinking and re-definition of the role of the teacher as a facilitator and resource person for assisting others with their learning. New skills and attitudes are required to perform these new roles successfully. One attitude is accepting that learning is a continuous process. If the elementary and secondary school teacher is to develop this attitude in the minds of children and youth, then it seems that he must understand and practice the concept himself. One way to achieve such understanding is to be involved in helping adults in achieving their own continuing education.

This is essentially an exploratory study which centers on developing a profile of part-time teachers of adults. In addition, the following questions were investigated:

1. Why do elementary and secondary school teachers engage in the part-time teaching of adults?
2. What are the backgrounds of these teachers?
3. What problems, if any, particularly of a unique nature, do they encounter in teaching adults?
4. What expressed needs, if any, do they have in increasing their competence in working with adults?
5. Assuming that training needs are expressed, what kinds of assistance would the teachers like to have and from whom would these teachers seek assistance?

It was thought that if there was evidence that part-time teachers of adults perceived any teaching problem areas peculiar to them, then appropriate guidelines could be developed regarding the pre-service and in-service preparation of teachers. The purpose of the study was to provide information which would be of interest to, and of practical value for, school boards, departments of adult education of universities, and teacher training colleges.

Selected review of literature

Trends in Teaching

A paper by Wayson (1964, p. 4) states that "The new teacher will work as often with adults as with children." Similar conclusions are drawn by Clarke and Coutts (1971, pp. 48, 54) for instance, the following trend is stated:

Candidates for teacher education, both for admission to preparatory programs and for first certification, will be required to exhibit a satisfactory standard of excellence in human relations; ability to relate to young people and to work with others, both young and old.

Forty-five per cent of the respondents to the above statement felt that this trend would be implemented between 1971-75 and forty-eight per cent felt

that it would be implemented between 1975 and 1985. In reaction to the statement:

Whereas now nearly all teachers are prepared for teaching at the Grades 1-12 (or 13) level, up to half will be prepared for teaching at earlier or later levels such as nursery, kindergarten, adult and continuing education.

Forty-five per cent felt that this trend would be under implementation sometime between 1975 and 1985.

Another study on trends in teacher education by Channon (1971, p. 9) indicated that for a number of institutions surveyed in the study, "... the major recent change in program was increased selection of options".

These three studies seem to indicate, among other things, that an increasing number of teachers will be working with older age groups. Secondly, that greater choice of options within the programmes of studies in teacher training institutions could conceivably make it possible for candidates to select adult education as an option, possibly accompanied by a related internship programme.

Studies of part-time teachers of adults

The purpose of a study by Messerschmidt (1967) was to determine the practices used by community colleges in the State of Michigan to recruit, hire, and prepare part-time instructors in vocational technical education. Topics which instructors wanted in in-service education included teaching methods, examination item writing, lesson plan preparation, and the philosophy of the community college.

In the face of arguments put forward for the financing of adult education in London (England) as a self-supporting service, Bryan (1969, pp. 285-90) writes that the need to educate and train part-time teachers has become more urgent than ever.

A study (McLarney, 1967) involving eleven junior colleges in the greater Los Angeles district concluded that in-service programmes should bring daytime practitioners and evening (part-time) faculty together for unstructured discussion sessions to strengthen academic and professional ties.

In a study on the Application Blank as a predictive Instrument for the Selection of Part-time Teachers in an Evening College, Heilig (1963) concluded that characteristics related to teaching success for the staff as a whole were, among others, teaching experience, graduate degree status, and professional group affiliations.

Styler (1968), in a publication entitled "Further Education: Part-time Teachers Speak," summarized reports of forty-four experienced part-time teachers in Yorkshire. His discussions include, among other things, the special problems relating to subject areas, teaching aims, difficulties, effective teaching, lessons learned by teachers, and the teachers' awareness of the needs of the students.

A highly relevant study relating to the topic of part-time teachers of adults was conducted by Shorey (1969). Although his study emphasized the elementary and secondary school teachers' participation in continuing education activities, he did ask those teachers who have been involved

during the past five years (or are now involved as an administrator, instructor, counsellor, etc., in any adult education program) to indicate the extent, if any, to which such participation has contributed to their personal and professional growth. One hundred forty-two out of nine hundred eleven respondents or 15.5% reported that they had been or are presently involved in teaching adults on a part-time basis. Such respondents were likely to be male, to be between the ages of 30 years and 49 years, to hold a degree, to have more than five years teaching experience and to be employed in a secondary school. Shorey goes on to add that:

The study found that day-school teachers attached considerable importance to working in a professional capacity with adults. It may well be that this activity provides a new and different challenge to the teacher and an opportunity to develop and explore challenging teacher-student relationships. If this hypothesis were substantiated by subsequent research, it might have several implications both for teacher training and for teacher work programs.

A longitudinal study (Draper and Ellis), to cover at least a five year period, is presently underway in the Province of Ontario. The study follows, over this five year period of time, the teaching and continuing education activities of teachers, from the time they graduate from French language teaching training colleges in Ontario. The study will examine the extent and patterns of involvement of these teachers in teaching adults.

This brief survey of the literature seems to encourage exploratory research on part-time teachers of adults.

Population and methodology

Data for the study were collected from the North York and Etobicoke school boards of metropolitan Toronto. Questionnaires were distributed to all of the part-time teachers of adults, employed by these two school boards, who were employed full-time either as elementary or secondary teachers. The analysis of data in this study was based on 294 questionnaires.

Presentation of data

Categories in the questionnaires were coded and the responses transferred to punch cards for computer analysis. Initial treatment of the data consisted of one-way tabulations and descriptive statistics. Much of the data were expressed descriptively in frequencies or in percentages.

Many of the questions required the respondents to rank alternative responses. Examples of such questions are where respondents are asked to indicate on a scale the importance their participation in teaching adults had for them. Another type of question asked respondents to indicate on a scale the degree to which a particular issue was perceived to be a problem. These data were treated by use of the Optimal Rating Scale (Bock, 1960).

Three hundred and sixty-nine contingency tables were constructed and analyses were carried out to discover whether or not key variables such as sex, age, school board, education, kinds of courses taught, years of experience and salary level were related to reasons given for teaching adults, perceived problems and expressed training needs. Significant differences were found in forty-four cases.

Analysis of data was organized under the following headings:

1. Personal information about the respondents, i.e. marital status and number of dependent children, sex, age.
2. Educational background of the respondents.
3. Occupational background of the respondents.
4. Salary ranges of respondents.
5. Information relating to the respondents' length of service and subjects taught.
6. Sources from which respondents have learned most about teaching adults.
7. Reasons stated by the respondents for wanting to enrol in a programme for teachers of adults.
8. Influence of teaching adults on personal participation in continuing education.
9. Influence on other teaching situations, from teaching adults part-time.
10. Nature of the teachers' entry into the part-time teaching of adults.
11. Reasons why adults enrol as students, as perceived by teachers taking part in the study.
12. Current problems in adult classes.
13. Perceived teacher training needs.

Summary of findings

In this article, the following summary of findings is limited to descriptive data.

Of the total number of respondents taking part in the study, 81.3% were male and 18.7% were female. The percentage of male part-time teachers of adults is considerably higher than the approximately 66% of males who are teaching in the secondary school system in Ontario. Likewise, the percentage of female respondents is considerably less.

Only 6.5% of the total responses indicated that the training received at teachers' colleges was a major assistance to the part-time teacher of adults. However, several respondents did indicate that their teachers' college provided an optional opportunity to observe and practice teaching with adults. Seventy per cent of the teachers thought that a seminar, or course in adult education, should be an optional part of the curriculum in a teacher training college.

Respondents were asked to state the reasons they would consider enrolling in a programme of studies for teachers of adults. The most important of these was stated to be "to increase competency as a teacher of adults" (36%). Twenty-six per cent stated that they wanted an opportunity to exchange ideas with other teachers of adults. The respondents stated that, in descending order, the adult education areas they would like to learn more about were: adult learning and motivation; teaching techniques and methods; instructional materials and audio-visual aids; the counselling of adults; and administration of adult programs.

Twenty-two per cent of the teachers indicated that they had considered transferring to full-time teaching of adults, 5% replied "no" and 17% said they "didn't know". Many who responded affirmatively to this question,

indicated that they were particularly interested in exploring opportunities in the Colleges of Applied Arts and Technology (community colleges).

In designing the questions for the study, it was believed that reasons for teaching adults might shift as the teachers gained more experience in the field. However, a similar response pattern is found to the questions why they initially came into adult education and why they were remaining in it. Respondents indicated that "an interest in working with a different age group" was their most important reason initially. Thus, the economic motive was not the primary reason for teaching adults. Other reasons given for entering this field were "a desire to try something new" and "an opportunity for personal growth".

Many teachers stated that peers and administrators had little or no impact on their decision to teach adults. In this group of part-time teachers a smaller number of teachers of credit courses than one would expect by chance looked upon personal growth as an important motivation, whereas more non-credit teachers considered personal growth to be an important reason for coming into adult education on a part-time basis.

Generally speaking, teachers regard night school teaching as a marginal extension of their primary function. However marginal these activities may actually be, 65% of the teachers reported that teaching adults has had some impact on their effectiveness as elementary or secondary school teachers. In the opinion of many, this experience has enabled them to present the real world more accurately to their day students and permitted them, as they work with highly motivated adults, to understand better the concept of learning as a life-long process.

Forty-one per cent of the respondents indicated that teaching adults influenced their own participation in continuing education. According to this group, it has broadened their horizons and provided a stimulus to experiment with new methods and procedures. It has suggested to many the importance of students being voluntary participants in the learning process. They have observed the impact of the attitudes of highly motivated adults, with clear objectives, on their learning achievement.

Teachers in the study indicated that they had learned most of what they now know about teaching adults from "on the job experience" and "informal discussions with colleagues". According to the responses, the amount they learned through their own school board, or from professional adult education associations, was insignificant. Interestingly, up to the present, teachers seem to have developed an internal communication network whereby they are able to discuss some of their activities relating to teaching adults. For one reason or another the teachers have apparently not tapped the resources of their own school board, nor have they tapped the resources of professional associations or academic departments within university settings. Furthermore, 98% of the respondents said that they did not belong to an adult education association; almost the same percentage indicated they did not subscribe to any adult education journals.

Teachers were asked to list in descending order the most important problems they faced. These were: working with students with widely differing levels of intellectual achievement, helping the slow learner, assessing learning problems of students and fitting the instruction to the

background of the adult students. It is the opinion of these teachers that many of their problems originate in the heterogenous make-up of most adult classes in terms of variety of experience, age, capacity, qualifications, and attitudes found among the students. Several night school teachers elaborated on the time shortage, stating that they frequently lacked sufficient time and energy to prepare adequately for night school classes.

Finally, teaching of adults was perceived by teachers as making an important contribution both to their professional and personal development. With respect to professional development, respondents who had engaged in teaching adults perceived this activity as making an important contribution to the development of their skills and competencies as teachers.

Discussion

There is ample evidence to suggest that the personal and professional growth of teachers is perceived by them to be enhanced by working with adults. It may not be so much the act itself that makes it worthwhile, but the fact that he is doing something different within the scope of his profession. This suggests that the systematic placement of teachers with different age levels of students throughout the teacher's professional career, be considered by school boards. Furthermore, if one assumes the desirability of children and youth interacting with adults, then more adult programmes could be scheduled during the daytime during school hours. The presence of adults in the school would help to impress upon youth the importance of continuing education. Conversely, it might be considered feasible to reschedule some high school classes to meet in the evenings.

This study seems to have important implications also in relation to the pre-service training of teachers. It is known that a substantial percentage of teachers trained for the elementary and secondary school systems enter some aspect of adult education. Is it not possible for teacher training colleges to incorporate greater opportunities for the teacher-in-training to learn more about working with various age groups, particularly the out-of-school population? This would be in keeping with the trend to develop more fully the skills of the teacher in his role as a facilitator of learning.

Colleges might be encouraged to offer greater opportunities to trainees to conduct their practicums with adult groups. The fundamental concepts of learning, and of working with and helping others, are presumably transferable, regardless of age group.

The study seems to have implications also for in-service training. Teachers involved in adult programmes could be encouraged by school boards to participate in special in-service training programmes where teachers would have opportunities of sharing insights and experience with one another, and of tapping the expertise of the professional adult educator.

The argument that teaching and learning are different as between adults and other age groups, even if true, should not be exaggerated. What seems more relevant is whether teaching older students does actually enhance the professional competence of the teacher and whether it satisfies certain personal developmental needs of the teachers.

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Environmental Variables Relevant to the Development of Cognitive Abilities

Data concerning several environmental variables considered likely to relate to cognitive development among Canadian boys aged 12 to 14 were factor analyzed and the resulting structures compared for three levels of socioeconomic status. Two techniques for comparing factor patterns derived from different samples were applied so that the degree of congruence of factors generated by the same variables in the different groups might be assessed. A generally high degree of factorial congruence across socioeconomic levels was noted, and the implications of this finding briefly discussed. (Dr. Bowd is Assistant Professor in the Department of Educational Psychology, Faculty of Education, University of Manitoba).

In 1964 Bloom pointed out that the "dearth of direct measures of the environment . . . restricts our fuller understanding of the development of particular human characteristics" (1964, p. 10). If particular human characteristics are to be measured and related to "the environment", then valid and reliable measures of environmental variables are necessary. Specific components of the environment considered likely to have direct implications for particular aspects of human cognitive growth and development need to be described and measured. In the past psychologists and sociologists have tended to use quite molar categories when attempting to classify environmental data, and have often assumed that their categories remained equally valid across different groups.

Discussing the inadequacy of then current research methods for dealing with these questions, Bloom (1964) goes on to define environment as:

the conditions, forces, and external stimuli which impinge upon the individual. These may be physical, social, as well as intellectual forces and conditions. We conceive of a range of environments from the most immediate social interaction to the more remote cultural and institutional forces (p. 187).

In Bloom's view the most fruitful level on which to examine the role of the environment lies between specific interactions or experiences and the total environment. He prefers to "conceive of the environment in terms of

the probability that it provides for selected experiences or interactions” (p. 187). This implies that for any given human characteristic there exist critical environmental variables, and that the development of that characteristic is a direct function of the probability of stimulation related to those variables.

Bloom describes these variables in a very general sense:

... the behavior of significant individuals in the environment, the presence and use of specific rewards and punishments, the presence and clarity of models of behavior, and the availability and use of particular facilities and materials (p. 221).

Utilizing Bloom’s guidelines, Wolf (1964) reduced the problem of assessment to the identification and measurement of those aspects of the total environment likely to relate to the development of selected specific behavioral characteristics. The initial selection of relevant environmental variables is dependent then upon the choice of a specific human characteristic to which they might logically be hypothesized to relate.

Previous studies which have been concerned primarily with the identification of common abilities across diverse socioeconomic and cultural groups have very often assumed the environmental variables they have assessed to be equally distinctive and salient across groups (e.g. Lesser, Fifer and Clark, 1965; MacArthur, 1968, 1969; Irvine, 1969; Vernon, 1969). However, as Evans (1970) has implied, this may not in fact be the case. It may be that patterns of intercorrelations for environmental variables in differing socioeconomic or cultural groups may generate quite different structures following factor analysis. Alternatively, there may be certain environmental variables which may be analyzed in terms of factors which are congruent across groups. The existence of such factors would depend upon similar patterns of correlations among the several environmental indices for each of the social groups included in the comparison.

When environmental assessment is carried out by self-report techniques it is important that items remain constant for different groups of subjects if factorial comparisons are to follow. Should consistent factor variables emerge, factor scores for such variables might be compared across groups by the usual methods.

Problem

The broad objective of this study then, is to attempt to discover whether a set of environmental variables presumably of significance for cognitive growth, generates similar factor structures across groups of varying socioeconomic status.

In the past it has been assumed that different factorial structures arising after the analysis of intelligence and ability test batteries in diverse groups represent different kinds of “intelligence”. Such differences in ability patterns have been supposed to arise from environmental conditioning, however at the same time it has been assumed that the relevant environmental indices have been related to one another in the same way for different populations. By selecting a molar category such as SES and examining the relationships between several environmental variables at different socioeconomic levels the latter assumption might be scrutinized more closely.

Method

Subjects

A total group of 233 boys aged from 12 to 14 was selected for the study. The subjects were selected in an attempt to provide a sample which represented the range of socioeconomic status typical of the Canadian population as a whole. Three Winnipeg schools drawing from diverse backgrounds provided the subjects, who were then classified according to paternal occupation using the Blishen Scale of social standing in Canada (Blishen, 1958).

The overall mean of the group was 52.40, with a standard deviation of 8.62, compared with the Blishen Scale's mean of 50 and standard deviation of 10. The median social standing of the selected sample was 50.10. The total sample was then divided into three groups. All those having a score of 56 or better were classified Upper SES, those scoring from 49 to 55 Middle SES, and those scoring from 37 to 48 Lower SES. These limits were chosen to provide three roughly equal groups showing approximate correspondence with Blishen Scale categories. The Upper group included 75 boys primarily from classes 1 and 2 of the scale. There were 70 subjects in the Middle group which accounted for most of class 3 and class 4. The Lower group was drawn mainly from classes 5, 6 and 7, and included 88 individuals.

Instruments

All subjects were administered three ability tests: Raven's Progressive Matrices (Raven, 1938), an open-ended Paper Formboard and the Mill Hill Vocabulary Scale, junior set A. Thus three abilities basic to educational achievement were assessed—general intelligence, spatial ability and verbal ability.

A questionnaire was constructed in order to obtain information concerning the aspects of the child's home environment considered likely to influence his cognitive development. This information was elicited directly from the boys themselves, and consequently must strictly be regarded as representing the child's perception of his environment.

A previous study (Bowd, 1972) indicated that environmental correlates of mechanical aptitude in diverse cultural groups may be described in terms of two basic factors, "background" and "activities", which showed considerable congruence across groups. The present questionnaire was developed in an attempt to examine whether similar factors might describe a sample of environmental items across different social classes.

An initial pool of 32 items was assembled, covering the following nine general aspects of the home environment: socioeconomic level of the family; exposure to relevant household objects and reading material; association with adult figures particularly skilled in relevant ability areas; leisure time activities and hobbies; vocational aspirations; perceived parental aspirations for the child; language background; nature of discipline in the home; mother/father dominance in the home.

Principal components analysis followed by varimax rotation was performed on these items for the total pooled data, and those variables loading

on specific factors and showing little relationship with other variables in the analysis were excluded from further examination. The item pool was reduced to those ten variables considered most significant in terms of their patterns of correlations with each other and with the ability test variables.

Scores were next analyzed after being separated for each of the three socioeconomic classes.

Method for factorial comparison

The environmental data for each social class group was analyzed separately by the principal components method followed by varimax rotation. In each case the ten background variables were accounted for in terms of four factors, each accounting for at least 10% of the total variation in the sample.

Two procedures were then applied in an attempt to determine the degree of congruence across different social classes of the factors so derived. The first approach involves the designation of one matrix as a standard or "target", the other matrices being rotated to maximal congruence with it (Evans, 1971). In the present case the Middle SES matrix was designated target following varimax rotation. The orthogonally transformed matrices of the remaining groups were then transformed to maximal congruence with the designated target.

The comparison of factor matrices still involves some degree of subjectivity. Most commonly visual inspection is employed, however in the present study comparison is aided by the use of Root Mean Square (RMS) Discrepancies. This index of similarity is calculated for each factor—it is the square root of the mean of the squared differences between corresponding coefficients in the two matrices. Comparison is further aided by the use of congruence coefficients (Harman, 1964).

A second method of producing maximum similarity between factor matrices does not employ a target matrix, but rather involves the mutual transformation of factors from each of the several matrices (Evans, 1971). The resulting matrices are such that all of the corresponding first factors are most similar, then the corresponding second factors, and so on. Additionally, the average of the transformed matrices is computed, it then being possible to compare the transformed matrices with the average matrix by use of the congruence coefficients and RMS discrepancies. Once the number of congruent factors has been determined, a final orthogonal transformation may be applied.

Results

The technique employed for assessing significant environmental variables in this study is that most commonly encountered in the literature—namely, self-report questionnaire regarding the presence or absence of objects, people and activities that the investigator considers likely to relate to the individual's development. In the past this method has tended *not* to yield large or impressive relationships between behavioral and situational variables, a finding which is also confirmed in the present study. Correlations between selected environmental variables and test scores were uni-

formly low, achieving significance in several cases because of the relatively large sample sizes employed. These data are presented in Table 1. However, the principal interest of this investigation is in the pattern of correlations between environmental variables themselves.

TABLE 1
CORRELATIONS BETWEEN SELECTED BACKGROUND
VARIABLES AND TEST SCORES

Background variable	Matrices	Ability test	
		Formboard	Vocabulary
Hobbies	22	08	90
Mechanical activities	12	06	23
Cultural activities	13	16	16
Books owned	03	09	12
Magazines	-06	-05	-04
Reference Books	14	13	19
Magazine subscriptions	-03	05	-03
Word Game	09	10	17
Chess or checkers	11	-03	22
Bicycle owned	13	02	06

Decimal points omitted

For $p = .05$, $r = 0.14$

For $p = .01$, $r = 0.17$

The total set of questionnaire items was analyzed by the principal components method and varimax rotated, and variables loading primarily on specific factors excluded from further analysis. The retained variables appear to depend mainly upon the actual activities performed by the child and the presence in his home environment of books and magazines.

TABLE 2
VARIMAX FACTOR MATRIX: UPPER SES

Variable	Factor			
	I	II	III	IV
Hobbies	07	<u>77</u>	-03	17
Mechanical activities	05	<u>09</u>	85	11
Cultural activities	06	03	<u>89</u>	02
Books owned	23	<u>65</u>	11	-26
Magazines	27	04	<u>33</u>	<u>72</u>
Reference books	<u>61</u>	05	<u>18</u>	21
Magazine subscriptions	03	-03	-05	<u>90</u>
Word game	<u>73</u>	-02	-07	<u>22</u>
Chess or checkers	<u>85</u>	02	07	-17
Bicycle owned	-15	<u>60</u>	06	00
Cumulative percent of variability	24%	38%	53%	64%

Decimal points omitted

TABLE 3

VARIMAX FACTOR MATRIX: MIDDLE SES

Variable	Factor			
	I	II	III	IV
Hobbies	-09	13	-34	-77
Mechanical activities	77	18	-05	-10
Cultural activities	42	05	14	-76
Books owned	56	29	05	-16
Magazines	22	66	08	-24
Reference books	81	-14	-24	03
Magazine subscriptions	02	85	05	05
Word game	05	53	-44	-03
Chess or checkers	40	13	-73	12
Bicycle owned	-05	-18	-73	-28
Cumulative percent of variability	26%	41%	53%	64%

Decimal points omitted

TABLE 4

VARIMAX FACTOR MATRIX: LOWER SES

Variable	Factor			
	I	II	III	IV
Hobbies	17	16	-17	74
Mechanical activities	-08	83	-07	15
Cultural activities	09	73	43	-01
Books owned	14	15	54	-01
Magazines	80	-04	24	-08
Reference books	20	16	60	28
Magazine subscriptions	80	02	08	34
Word game	03	-08	69	00
Chess or checkers	-30	-25	40	57
Bicycle owned	17	16	39	52
Cumulative percent of variability	25%	38%	49%	60%

Decimal points omitted

The independent varimax factor matrices for each of the samples are dissimilar in a number of respects. As Tables 2, 3, and 4 illustrate, factor loadings tend to be very mixed across groups, making visual comparison almost impossible. In each group separate factors loading on reading material available and on cultural and mechanical activities performed are evident. The loadings on the remaining factors are quite mixed and interpretation is not considered possible.

In order to determine the similarity of the factor patterns emerging

for each group, the varimax matrix for the Middle SES sample was designated as "target" or standard, and the two remaining matrices rotated to maximum congruence with it according to the procedures described by Evans (1971). RMS discrepancies and congruence coefficients were computed for each factor in both groups (Table 5).

TABLE 5
FACTORIAL CONGRUENCE WITH TARGET MATRIX

Group	Congruence coefficients			
	Factor			
	I	II	III	IV
Upper	85	83	73	71
Lower	79	76	92	63

Group	Root Mean Square Discrepancies			
	Factor			
	I	II	III	IV
Upper	24	24	28	28
Lower	28	28	15	31

Decimal points omitted

The degree of correspondence between the varimax factor patterns for the Upper and Lower SES groups when compared with the Middle SES group was generally moderately high. The first three factors showed reasonable congruence, however the fourth factor cannot be considered equivalent across groups.

The second method for comparing factor structures arising in different groups was then utilized. The varimax matrices for each social class sample were rotated by orthogonal transformations so that successive factors are maximally congruent. The resulting matrices are such that all the corresponding first factors are most similar, then the corresponding second factors and so on. Thus no single factor matrix is considered as a possible standard, and the procedure becomes rather more useful when factor interpretation after an initial analysis is problematic.

For comparative purposes the average matrix of the individually transformed matrices has been computed (Table 6), and both Congruence Coefficients and RMS Discrepancies calculated. As Table 7 shows, there is a high degree of congruence across all groups for all four factors.

The average of the matrices generated by maximizing congruence for successive factors has resulted in four congruent factors which are open to more ready interpretation than those arrived at by the procrustean approach.

The first factor, loading highly on both cultural and mechanical activities, appears to be defined by the actual operations the child performs

TABLE 6
AVERAGE MATRIX: VARIMAX ROTATED

Variable	Factor			
	I	II	III	IV
Hobbies	12	14	-01	.78
Mechanical activities	.75	04	08	.05
Cultural activities	.83	09	02	09
Books owned	.34	08	.33	14
Magazines	.22	.75	.12	00
Reference books	.36	10	.58	03
Magazine subscriptions	-.03	.84	.05	10
Word game	-.01	.29	.59	02
Chess or checkers	-.01	-.11	.76	.21
Bicycle owned	05	-.04	.25	.52
Factor content	Activ- ities	Maga- zines	Verbal Background	Practical Background

Decimal points omitted

TABLE 7
FACTORIAL CONGRUENCE WITH AVERAGE MATRIX

Group	Root Mean Square Discrepancies			
	Factor			
	I	II	III	IV
Upper	10	13	14	18
Middle	14	16	16	16
Lower	11	14	14	17
Group	Congruence Coefficients			
	Factor			
	I	II	III	IV
Upper	97	95	95	87
Middle	95	92	92	88
Lower	96	94	94	88

Decimal points omitted

upon his environment and has been termed "Activities". Factor II is characterized by the two single high loadings for magazines reportedly read and magazines subscribed to from within the home. The third factor has been named "Verbal Background" because of the pattern of loadings for aspects of verbal stimulation in the home, while the last factor has been named "Practical Background" because the two variables with which it correlates highly are hobbies and ownership of a bicycle.

Discussion

The principal finding of this study is that for a sample of Canadian boys representing three major levels of socioeconomic status in a Canadian city, a limited set of environmental variables generated congruent factorial structures. Accepting that certain limitations are evident, it is implied that environmental variables may be categorized in a similar fashion for contrasting socio-economic levels.

There are several important limitations which restrict the generalizability of this study's findings. Firstly, a set of environmental variables was selected from an initially relatively small pool of items and subjected to analysis after it had been determined that these variables related in the most part to certain cognitive test scores. Replication of this study with another subject sample is suggested in order to check these relationships.

Secondly, the factors emerging in this study may be in part a function of the sample tested. Only boys were tested, all coming from an urban environment—however it should be stressed that a relatively large and socioeconomically representative group was selected. Perhaps of greater significance than sample limitations are limitations stemming from the method used to assess environmental variables (self-report questionnaire). Further research to examine similarities between factorial structures descriptive of the environment might very well take account of different techniques of assessment such as rating scales and direct observation techniques.

Although two methods have been used to compare factorial structures, it seems evident that the second was more successful in that emergent factors were more meaningful. Where exploratory research is being carried out and it is not necessarily desirable to consider one pattern as "standard", the mutual rotation technique may well continue to prove more fruitful.

Finally it may prove useful to conceive of the environment in terms of equally salient and meaningful factor variables as they functionally relate to specific behavioral characteristics. In the present study there was a tendency for factors to be defined by variables which might be considered as resources present as part of the child's background, and by variables representing operations actively performed by the child in interaction with his environment.

This finding suggests that the environment is most fruitfully examined in a context of the individual's transactions with it, and the functional consequences of these for his behavior in the long run.

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Education in the Northwest Territories

REVIEW ARTICLE

The author reviews three major documents on education in the Northwest Territories published recently by The Territorial Government, and points out a few basic issues which require closer examination. (Dr. Bhattacharya is Professor of Philosophy of Education in the Department of Educational Foundations, The University of Alberta.)

Introduction

My primary aims in this essay are to bring to the notice of educators and research workers three recent documents containing information and recommendations about education in the Northwest Territories of Canada, and to point out what appears to me from a study of them to be some of the basic problems awaiting careful consideration. The documents are: *Survey of Education—Northwest Territories, 1972* (hereafter referred to as SE) prepared by the professional staff of the Department of Education, Government of the Northwest Territories; the *Report of the Special Committee of the Council of the Northwest Territories to Study the "Survey of Education—Northwest Territories"*, January, 1973) (hereafter referred to as RSCC; and "a hand book of Curriculum Development" entitled *Elementary Education in the Northwest Territories*, (recent but undated) published by the Curriculum Division, Department of Education, Government of Northwest Territories (hereafter referred to as EE). The three documents together comprise about 600 closely typed and printed pages, and contain the latest collected data on various aspects of northern education and a variety of recommendations. Any one interested in studying the educational system in N.W.T. or in exploring its many problems will find these documents immensely useful.

The Challenge and Response: A Summary

For nearly two decades a programme of free universal public education has been in operation in the vast expanses of Canada's Northwestern Territories. In quantitative terms the achievements of the Federal Government

so far are beyond reproach. New schools and residences both small and large, housing for teachers (and low-rent housing for Indians and Eskimos), airfields and other means of transportation, advanced expensive facilities, including the Anik satellite, for communication have been built; the administration of education has been transferred from Ottawa to Yellowknife in N.W.T.; the enrolment of school age children has risen from about 10-15 percent in 1949 when the Federal education programme started to a figure between 95 and 98 percent by 1971; and new offerings in kindergarten, vocational, and adult education have gradually been introduced in the schools. However, there has all along been great confusion and uncertainty as to the precise purpose or goal of education for the native population of the north; statements on needs, objectives, and requests remain to this day conflicting, often contradictory; and there has not yet been any clear and generally agreed formulation of basic aims and procedures for northern education. In the circumstances of the north where native non-European-Canadian people are the majority, but are divided amongst themselves by race, culture, language, and a wide variety in living conditions, the aims and priorities of formal education and of economic and social life cannot emerge without significant and sustained efforts by the government, industry, social reformers, teachers, and above all the people themselves. The documents can therefore be seen as an initial move in the right direction.

Survey of Education—Northwest Territories, 1972

The SE is the work of staff members of the N.W.T. Department of Education. It took about a year and a half to prepare, beginning in the spring of 1970. While the evaluation of the present programme, and the formulation of general principles for the whole of the Northwest Territories were undertaken by the staff at Education Headquarters in Yellowknife, a similar task for each area was undertaken by the teachers, supervisors, principals and superintendents of the areas concerned. The final result is the outcome of a two-front approach, and constitutes a set of observations and recommendations representative of the views of the majority of those directly involved with education in the north.

The SE comes in a format currently fashionable, namely, statements of recommendations on one side, with comments, explanatory notes and supporting material on the other. The contents of the SE cover almost every aspect of formal education: the purpose of education; the pre-school, elementary, secondary and continuing (i.e., vocational, higher, special, and adult) stages of education; curriculum development; school buildings and school supplies; residence and maintenance; teacher training; counselling and guidance service; classroom assistants programme; financial resources; administration at various levels; local involvement in education; and the Territorial Schools' Ordinance. The document also contains an impressive amount of factual information and statistical data about the development of school systems in the north. It reproduces in a final section verbatim copies of the sixteen briefs including one by the Northwest Territories Teachers' Association, and thereby helps the readers to secure some insight into the educational progress and problems in the

different regions of the Territories. The document contains recommendations for changes and improvements in many aspects of northern education including the main objectives "which will reflect the stated wishes of the northern population served by the Territorial Department of Education" (p. 4). The individual briefs in many cases make further recommendations designed to meet the exigencies of local and regional educational institutions. On the whole, the SE is a well-planned and carefully worded document which deserves wider attention than it has received so far; it also demonstrates the sort of concern and dedication on the part of many educators in the north that merits special recognition.

*Report of the Special Committee of the Council
of the Northwest Territories to the Study "Survey of Education—
Northwest Territories" 1973*

The Commissioner of N.W.T. appointed in October, 1972 a Special Committee of the Council of the Northwest Territories to examine the recommendations made in the SE and report back to the entire council. The Special Committee consisted of four members: Mrs. Lena Pederson (chairwoman), Dr. Louis-Edmond Hamelin, Bryan Pearson, and James Rabesca. Meetings of the Special Committee were held at Yellowknife on November 19-24, 1972. One member, Dr. Hamelin, was unable to attend the meetings; however, he sent his comments on the first draft report prepared by the three other members. A summary of his comments is published as Appendix B of the RSCC.

The RSCC is the result of the review by the members of the Special Committee of the many proposals for reform, reorganization, and improvement of existing conditions and opportunities made in the SE. While many recommendations are accepted without modification, and some are even designated as "top priority", the RSCC does not agree with some very fundamental positions taken by the authors of SE on matters of educational objectives, medium of instruction, with some specific details on matters relating to adult education, teacher training programme, and also with the proposed location of a community college to work in affiliation with southern universities. For those who may not be aware of the recently adopted policies on education by the N.W.T. Government, it must be noted that, among others, the following recommendations of the RSCC have already been accepted by the N.W.T. Council:

The Committee recommends that grade 9 should be provided in all communities in the Territories. At this level it should be determined in what direction the student will proceed, academic or vocational. Taking into consideration the student's age, those continuing in academics could be sent to another community to attend high school and study in a hostel; those wishing vocational training could attend courses in regional centres (RSCC, p. 6).

and

Again, the Committee expressed strong disagreement with major emphasis placed on teaching English language. The mother tongue of the native people must be retained and English should not be the first priority, especially during a child's first few years of school. The emphasis must be on his own language during this period. After a solid background in his mother tongue is developed, English can be given more emphasis (RSCC, p. 8).

The Special Committee also noted that it “does not approve of hostels” (RSCC, p. 17). The Commissioner of the N.W.T. has since announced a policy of building smaller schools in as many settlements as possible to allow the children to live with their parents. The RSCC is against compulsory school attendance as well, and it recommends that

When parents must leave a settlement to earn their living on the land, they should be encouraged to take their children with them whenever possible. This should be considered part of the child’s education. . . . It is far more beneficial for children to go with their parents than to stay in school to be taught by white teachers (RSCC, p. 17).

While these policies, on the whole, reflect concern of a certain kind, it can be argued that all of them may not *in practice* prove compatible with the aim of equipping the native population of the north “to live in the ever-changing and rapidly developing North and the rest of Canada”, or that the language policy in particular is not quite feasible as there are at present not enough native or non-native teachers, counsellors, and classroom assistants knowledgeable in the many native languages. And, again, some native languages are already dead, some are fast dying out, and around Cambridge Bay, I am told, the native language has already acquired a pidgin character. Are they all worth reviving or retaining? And also, to what extent is the native northerners’ life today “their traditional way of life”? It certainly sounds very unfortunate that any people should lose “their cultural heritage”; but, again, is there a culture anywhere in the world whose every single feature is or can be shown to be worthy of respect and retention? The purpose of education is to preserve and transmit the worthwhile, and this requires continual consideration of conditions and criteria relevant to changing situations. It is precisely on these grounds that the Special Committee finds it necessary to reject an educational policy for the north “based on southern-oriented system.” However, its own appeal to the “cultural heritage” and “tradition” of the northern population requires closer examination and evaluation. For uncritical and emotional appeal to “the tradition” can be used to justify anything from an oppressive dictatorship in some countries to a system of education designed to keep a large number of native people in the north occupied with increasingly unrewarding older patterns of life. The RSCC’s policy recommendations raise these and similar questions.

*Elementary Education in the Northwest Territories: A Handbook
for Curriculum Development*

This handbook possibly came into circulation in the beginning of the 1971-72 school year, and certainly before the RSCC’s recommendations on the native child’s first acquiring a “solid background in his mother tongue” and lesser stress on learning the English language at the “first few years of school” were adopted by the N.W.T. Council. For the handbook provides a time-table for daily language instruction from Year One, which includes teaching of English as a second language with 10% of the time devoted to it in the first year and gradually taking over 90% of the language teaching time by the seventh year. (EE, pp. 85-86.) While the “Language Arts” section of the handbook does exhort the teacher to “re-

spect the dignity of the child's first language", it does not provide any adequate guide-lines for the teachers to teach the many native "first languages". This would be an extremely difficult task as (i) "within each language there are dialectic differences"; (ii) "two or more languages have become integrated to the extent that a local functional language has developed. . . . the prime example of this is found in the Mackenzie Delta where English, Eskimo and Loucheux have become integrated to the point that a 'Deltanese' language is recognizable"; (iii) "certain languages are falling into disuse"; (iv) "the Athabaskan languages are employed almost exclusively in their oral forms with no written forms commonly employed". (EE, pp. 80-81.) The authors of the handbook are closer in their thinking on language teaching to the recommendations made in the SE than to those made by the Special Committee, though the latter have now become the official policy in the N.W.T. The authors of the handbook were certainly aware of the fact that they were formulating a loosely organized "compromise" curriculum, but they made no attempt to hide the stark political realities of northern life. On the question of language they have this to say:

The language by which you "Get Ahead" in the North is English. Whether you want an education, a job, mobility in terms of the larger Canadian society, or what-you-will, in the final analysis what happens to the individual will be almost solely dependent upon his competency in the English language. Certainly from a school point of view alone, the student's success or failure in terms of his education will rest almost entirely on his ability to master the English language. (EE, p. 81.)

In all its essential features the N.W. T. today is a semi-colonial political society—only more complex culturally and much more vulnerable to direct and rapid exploitation than were the many remote possessions of the colonial powers in the past centuries. A revealing "Introduction" to the EE outlines these features in abundant clarity: "A quick tour of any settlement will reveal the disparity in housing conditions between native and non-native residents"; "Even more obvious, is the housing segregation characteristic of many settlements . . . In too many settlements it is possible for the teachers to go back and forth to work each day and literally never set foot in the real community in which they live"; communities "may well be over-organized to the point where the people are confused"; "How can you expect me to know him? They all look alike to me" or the more familiar over-simplification, "well, they are Indians"; and the inferior treatment of the native people in numerous textual material—"If all the prejudiced material was to be summarily destroyed there would not be much left." And so on. (EE, pp. 8-15.)

I have noted earlier that the EE is a "compromise curriculum". In the absence of well-defined social, political, and economic goals for the majority of the northern population, it is impossible for the curriculum designers to prescribe preferences or priorities stressing a minimum of common subjects, skills or attitudes to be taught in the schools. The goals in life for the average native northerner remain open in the years to come, as they are now:

. . . to choose among and between . . . the wage earning economy; trapping, fishing, hunting economy; guaranteed annual income economy, and leisure-oriented social living. (EE, p. 4.)

The emphasis naturally is on individual freedom: "the individual is free to make his choice". But to what extent are these "possible life patterns"—except a guaranteed annual income or permanent welfare—real alternatives to the natives? And to how many? The EE in the section on "Social Studies" provides an answer. The teacher, it says, would be seriously mistaken if he assumes that "recognition of the 'mosaic' was all that was required. The vital second step is to become aware . . . of the *realities* of Northern Living." (p. 254) The teacher is urged to keep in mind the realities which include the following: "economically, the life of the Northern people is controlled by a minority of Euro-Canadian population"; "politically, the major decision-making power has been the almost exclusive prerogative of the minority Euro-Canadian population . . ."; "the mass media exemplify, if not extol, a way of life foreign to the majority of northern residents . . ."; "stable, wage earning opportunities are relatively limited; most well paying jobs are held by Euro-Canadians"; ". . . the 'welfare state' is a fact of life for much of northern population in the sense that it provides the one source of steady income upon which people may rely". (EE, pp. 254-255; also p. 195.)

If the realities of northern society are not heart-warming, and not much has been said in these documents about the means of relieving them, the blame does not rest with the educators and curriculum designers. While the curriculum can be seen as the most essential component of an educational policy, in the sphere of developing or adopting any such policy it is not generally the professional educators who have the strongest influence. This explains in part, I think, why these three documents fail to reflect a consistent wider perspective on the whole subject of northern development though they all seem to convey an unmistakable sense of urgency in planning for northern education.

Buildings, Maintenance, and Supplies

Among the difficulties experienced by school administrators and teachers in the normal execution of their duties in many northern schools, some without doubt stem from the remoteness of locations and unfavourable climatic conditions, the general economic and cultural backwardness of the local communities, and a centralized bureaucratic system of administration. All the documents, particularly the SE and the RSCC, point out problems which can be seen as arising from one or a combination of these factors.

School buildings are a case in point. As the Northwest Territories Teachers' Association points out,

School buildings in the Northwest Territories are a prototype of traditional southern schools in architecture. Not always taken into consideration are the particular functions of the school rooms The northern climate creates a long season of indoor activities; activities demanding space for freedom of action. (SE, p. 211.)

The SE recommends building standards which should take into consideration "special requirements of the N.W.T. education programme, the needs of communities which we serve, and the particular geographic and climatic conditions under which we operate." (SE, p. 75). It appears that

in matters of sites, design and furnishings, there has been little or no consultation in the past between the architects and informed teachers. In most areas, "the harsh cold and long dark days . . . confine the students to indoor activities mainly". In most settlements a school house is the only building that can serve as a community and youth centre for cultural and recreational activities. The more suitable a school house is for community activities, the easier it is for the school to increase and to maintain local interest and involvement in its work. The Special Committee appears to be appreciative of these considerations, and in agreeing with the recommendations made in the SE on school construction, it observes:

The structures that are being built in the north look very temporary and the Committee felt that we should be building more permanent type units. Pre-fabricated material being shipped into the North must of necessity be very sturdy to withstand the banging around it usually gets during shipment. Because of this the cost of shipping is very high. The use of northern materials in those areas where available would greatly reduce this expense. (RSCC, p. 18; also p. 4)

Lack of adequate arrangements for proper maintenance of buildings and equipment appears to be another matter of great concern. One school brief points out that "maintenance of schools and staff housing in the north is very poor" (SE, p. 198), and the same appears to be true of many student residences. (SE p. 70). Another brief states, "Any repair or maintenance work sometimes took months to get done or went undone. Work started has been often uncompleted." (SE, p. 194). At present, it appears, there are not many caretakers able to perform simple repair and maintenance works in the schools; maintenance services are not locally available in most places. As a consequence, equipment often falls into a state of disrepair; requests for funds and service personnel must pass through more than one government department before the request is approved. Both SE and RSCC recommend measures including training for custodial staff in maintenance and management procedures. Teacher housing in the north—which often dictates the number of teachers that could be hired—is often sub-standard, and is a major factor in causing teacher discontent. The Special Committee agrees with the recommendations that the N.W.T. Government must place high priority on a programme of adequate teacher housing and "adopt a policy of preventive maintenance of housing units, rather than follow the present policy which seems to be one of maintenance by crisis." (SE, p. 80; RSCC, p. 20).

Several briefs point out the difficulties experienced in obtaining school supplies—textbooks and other educational and co-curricular materials, maintenance requirements including cleaning materials. (SE, pp. 162, 176 and 194). One brief states:

Schools are required to have their annual requisitions completed usually not later than January 31. Why then do purchase orders for many of these items not come through until the end of August? Why are many requisitions not even approved until this (?) date? (SE, p. 194)

There seems to be confusion and disagreement about food rations policy for teachers. The SE favours a consistent procedure for determining the teachers' eligibility for food rations, (p. 81) but the Special Committee recommends a complete elimination of rations. It suggests that

Teachers should receive full information of what is available in their assigned community before proceeding to their destination so that they may purchase what is required. (RSCC, p. 21)

The Special Committee, for reasons not quite clear, seems to be least interested in one matter close to most people's heart, namely, food. I have no idea what its views are, as there is nothing on record, concerning a recommendation made in the SE for the elementary school level:

That each child be provided with a school lunch and such other food and/or vitamin supplements as may be deemed necessary during the school day. (SE, p. 29)

While the RSCC is silent on the subject, the EE warns teachers in its section on "Health":

To teach Canadian food rules, or some other arbitrary standard, makes little sense if the students are living at bare subsistence standards. For example, to feature orange juice, toast, bacon and eggs, and a tall tumbler of milk on a bulletin board display and thereby convey the idea that this is what constitutes breakfast is as pointless as it is heartless . . . the health teacher must begin with the known and the possible rather than the foreign and the ideal. (SE, p. 47).

The "known" and the "possible" are listed as tea, bannock, and fish. The health curriculum, as the EE contends in introducing the subject, "is regarded as being potentially the most delicate aspect of the school program." And this, in fact, says a lot. It should not be surprising that teachers from outside the north do not want to work for more than a period of two to four years in such an indigent environment, which some of them may find personally embarrassing.

What steps are in the right direction?

Until recently the general aim of native education in the Northwest Territories was some kind of assimilation or integration; consequently, the northern education programme was content to depend heavily on established practices in the southern provinces. This was convenient to the many southerners who had moved into the Northwest Territories (and who held the economic power) as they expected their children educated in a manner which would enable them to return and live effectively in the southern provinces later. However, within more recent years there has been a significant change in the outlook of the Federal Government and a large segment of Canadian people towards minority ethnic cultures. One of the most important features of the new outlook is the disposition to preserve native languages and cultures, and as far as possible their traditional ways of life. This has naturally led to some quick rethinking of the objectives and emphases of the northern educational system. The documents under consideration are an indication of the efforts to bring educational policies closer to the new moods and convictions.

The Aims of Education

Educational aim-statements everywhere are often phrased in such generalities or expressed by use of 'virtue words' that their full implications cannot be grasped without some detailed analysis or a close examination of the procedures recommended for achieving these aims. The goals of

northern education proposed in the documents abound in phrases suggesting shining ideals: opportunity for maximum development, satisfying personal life, restoring pride, self-respect, and confidence, preservation of cultural heritage, appreciation of the sum total of human experience, preparing participating members of a rapidly changing complex society, creating good leaders and good citizens. The language testifies to the newly-found social goals of a multicultural nation. Understandably, Canadians of good will are looking towards the classrooms to contribute directly to the attainment of these goals. But are the proposed aims quite compatible? Are the recommended procedures—in this period of poverty, unemployment, and inequalities in the north—adequate in practical terms for reversing the present social tendencies?

Consider, for example, one stated objective of northern education. The RSCC puts it this way:

To have the opportunity to adapt to the white man's way *but* without losing their traditional way of life, their own language, and their cultural heritage. (RSCC, p. 2).

The question is: How does the educator combine one side of the *but* with the other? The SE and the EE, as we have noted, stress the need to teach English along with the mother tongue from the first year of schooling. The RSCC rejects this recommendation as "not desirable". Instead, it urges the promotion of the many native languages to the extent to suggest that "the Government, whenever possible, in its dealings with the native peoples should endeavour to communicate with them in their own language." (RSCC, p. 2). And, how does the school go about reconciling "the white man's way" with the native peoples' "traditional way of life"? Interestingly, the EE provides a comparison table of ten fundamental values of Euro-Canadian and Athabaskan-Eskimo societies which are clearly conflicting. (EE, pp. 7-8). Can a simple *but* brush away these fundamental differences? It is indeed difficult to imagine that the proposed procedures would bring any significant change at the higher education level, which as at present can be seen from the following figures.

TABLE 1
HIGHER EDUCATION ASSISTANCE
STUDENT GRANTS

Year	Total	Indian	Eskimo	Other
1967-68	67	-	1	66
1968-69	97	-	1	96
1969-70	116	7	2	107
1970-71	109	3	1	105

(SE, p. 148)

This foreboding is confirmed, indirectly but nonetheless pointedly, by a member of the Special Committee, Dr. Louis-Edmond Hamelin. He argues that

... a special system for the native students will not be the ideal system for the white students . . . However, despite the cost and the complicated structure required, it may be necessary to have two systems in order to provide equality among the set of Canadian cultures. *If*, on the other hand, the indigenous people want to receive this instruction and education in the dominant language in Canada, i.e., English, only one system is necessary. (RSCC, Appendix B)

The smooth sliding unexamined *but* seems to become in the more realistic market language a stumbling *if*. The issue has to do with language, and what may have appeared to the majority of the Special Committee as a matter deserving emphasis—cultivation of native languages and cultures—becomes in the eyes of Dr. Hamelin “a special system for the native students”. He is skeptical of the cash value of the proposed priorities, and in a businesslike manner makes it clear that southern whites coming to the north have little to gain from an education designed for a people who “are between two cultural ages”. He has a point. It can be argued, I believe, that all the high-minded aims notwithstanding, in realistic terms the recommended educational priorities and procedures are well behind the times; the new education may succeed at best in transforming the original inhabitants of the north into a new industrial proletariat, and nothing more. It must be realized that any enthusiasm for his partly destroyed cultural heritage is not going to help the native northerner to break through the firmly entrenched cultural, economic, political, and other barriers that stand in the way of his joining the mainstream of Canadian life.

Curriculum Development

For many years the schools in the north worked with borrowed and externally imposed programmes and standards. Any innovation in curriculum, or the introduction of “unauthorized” reading material by teachers was not only discouraged, but punished. Section 114 of the N.W.T. School Ordinance, which seemed to believe in “destroying the atmosphere to prevent fire”, stated unabashedly:

A teacher, trustee or other person who uses or causes to be used an unauthorized textbook or reference book, either in the place of or to supplement an authorized textbook or reference book upon the same subject, shall be guilty of an offence, and liable on summary conviction to a fine not exceeding twenty-five dollars and costs, provided, however, that no prosecution under this section (will take place) except by order of the Commissioner. (Quoted in SE, p. 193)

The current endeavour of the Curriculum Division of the N.W.T. Department of Education, which is producing a curriculum guide for junior high school for the 1973-74 school year, has no help from previous programmes, co-ordinated research or serious discussion of the many educational issues related to the circumstances of contemporary northern life. In fairness, one should be patient with pioneering efforts. However, a word of caution is appropriate, particularly in view of the intensive drilling, extensive piping, and the rest the north seems destined to put up with in the future. The EE, as I have noted, offers a realistic portrait of the life of native northerners. But its recommendations, based on a principle of “parity” or “equal time” to be given the various cultures and languages, reflect an attitude of conscience-ridden hesitation. It appears unsure in some other respects as well. The main theme “reinforced in the minds of all educators

time and time again", that "Northern education must reflect the needs and aspirations of all children" is distressingly vague, and can be understood in a variety of senses. What the curriculum builders should have been aware of is the lamentable fate of educational slogans of this sort. They can be used as well-greased chutes to help generations of unconsulted children to slide into the cave of poverty, unemployment and dependence. If an expensive programme of formal education in the north cannot enable the majority of native children to evade such a future, the whole exercise is almost pointless.

Classroom Assistants: Are the Barriers Uncrossable?

Classroom assistants act as interpreters between the teachers and young children, explain the actions of the school to the adult members of the community, review exercises, supervise seating arrangements and play activities, and "undertake some of the purely mechanical tasks". They have been in the employ of N.W.T. Department of Education since 1958. The number of assistants in the school year 1971-72 was 70. With the introduction of pre-school education in some areas, and emphasis on the teaching of native languages, the number of assistants is bound to increase at a fast rate in the near future. These assistants perform two essential functions: in many classrooms in the north teaching and learning are possible only through them; and in many areas they are the only source from which the teachers can acquire some knowledge and understanding of the local language and culture. They are mostly young native persons who can communicate in English or French and in a native language. They receive an initial on-the-job training. Some of them have been working for four years or longer. However, they do not as yet enjoy any Public Service pay schedule, nor the rights and privileges of the teaching personnel. "Housing is often a problem for the assistants . . ." (SE, p. 90).

Quite understandably, all the documents and the individual briefs appended to the SE devote considerable attention to the necessity of employing classroom assistants, the procedures for recruiting and training, their roles in the classroom and with the community outside, their status, pay, and other privileges. But there is little about the possibility—except in one brief (SE, p. 159)—of their academic upgrading and obtaining certification as teachers. Both the SE and RSCC recommend that classroom assistant programmes be accepted as a "necessary, integral and continuing part of the total education programme". "Every school in the Territories with inter-cultural classrooms should have at least one assistant available by the 1973-74 school term" (SE, p. 90; RSCC, p. 24). The RSCC also recommends that the salaries of the assistants be "increased to an acceptable level", and that they "should also participate in an annual teachers' conference". In the same context, while urging that "the number of native northern teachers should be increased to as many as possible", it suggests:

Although a lowering of standards is not desirable, some compromise might be affected to certify as many as possible under the Territorial Teacher Education Programme but not for all of Canada (RSCC, p. 2).

However, it does not propose that experienced classroom assistants who show promise should have the opportunity to qualify as certified teachers. The brief of the N.W.T. Teachers' Association asks for "pre-service bur-

saries . . . to prospective teachers to take . . . northern oriented courses”, but only accommodation and training for the native classroom assistants “for as long as they are needed” (SE, p. 211). Are we to assume that prospective teachers who need northern oriented courses will be able to teach native languages and courses dealing with native cultures? Why, one may wonder, in the context of “parity” of cultures and languages, does not the RSCC urge the development of school texts in the native languages? There appears to be a gap between the educational policies adopted by the N.W.T. Council and the rather half-hearted measures suggested in the Report.

Teachers and Teacher Training

Data for 1970-71 show that a great majority of teachers in the non-municipal schools in the N.W.T. are Canadians, and have Canadian teacher certificates. Of 496 teachers, 424 had their initial training in Canadian provinces (only 5 in N.W.T.); 6 in the U.S.A.; 41 in the U.K.; the rest are from Australia, New Zealand, the Philippines, India, and Europe. It may be of interest that among these teachers are 70 married couples, 34 single males, 118 single females, and 6 Sisters. The large majority are below 30 (average age 30.91); they earn an average salary of \$10,182.92 per year. The student-teacher ratio in N.W.T. schools, as the following figures indicate, has consistently been satisfactory:

TABLE 2
STUDENT-TEACHER RATIO - NORTHWEST TERRITORIES

Year	Teacher	Student	Ratio
1966-67	366	6880	18.74
1967-68	409	7608	18.60
1968-69	445	8212	18.45
1969-70	499	9100	18.23
1970-71	532	10056	18.70

(SE, p. 139)

One disquieting feature in the northern educational scene is that the teachers do not stay there for more than a few years. As a result the system suffers from the inexperience of the teachers. The following table illustrates the point.

The proposals (SE and RSCC) to reduce teacher turnover do not go beyond modification of certification rules, methods of salary classification, and the like. An example of negative thinking is the suggestion to place an increased share of financial responsibility for removal expenses on the teacher to discourage him from moving out. There are no concrete suggestions of incentives to make northern schools attractive to people interested in exploring fresh ideas or experimenting with new methods. The Special Committee wants to see more northern trained native teachers as “it is unlikely that such teachers would want to move to the south to work anyway” (RSCC, p. 10).

The idea of having northern trained and more native teachers is consistent with the new educational policy, and certainly sound in principle.

TABLE 3
EXPERIENCE OF TEACHERS BY YEARS
IN NORTHWEST TERRITORIES

No. of Years in N.W.T.	No. of Teachers	Percentage
1	177	35.97
2	126	25.61
3	67	13.61
4	43	8.74
5	20	4.06
6	10	2.03
7	9	1.83
8	8	1.62
9	10	2.03
10	5	1.01
11	4	.81
12	6	1.22
13	2	.40
14	3	.61
15	1	.20
18	1	.20
Average - 2.95 years		

(SE, p. 142)

This would not necessarily mean, as far as I can see, an immediate lowering of teaching standards. There is a need for a new policy of teacher evaluation, for salary classification, and other related matters. The documents are rather ambivalent at this point.

The need for a unique educational policy for the north has been thoroughly canvassed in the documents, and has been largely accepted by the N.W.T. Council. A southern system of education for the north has been rejected as both inadequate and undesirable. Teachers from southern Canada have been found to be ill-equipped, and southern counsellors "most ineffectual in their role in northern schools". As a result, southern school programmes are in the process of being replaced at every level of northern education by new programmes which would hopefully "provide appropriate learning experiences" for northern students. But these schemes are not accompanied by decisive efforts to bring corresponding changes in policies embracing the criteria of teacher education, performance and classification. True, there is at present a N.W.T. Teacher Training Programme, but little is said about its adaptability and resources. Both SE and RSCC recommend continuation of the close liaison with The University of Alberta. But speculation about problems and possibilities is no substitute for decisive action.

Review Notices

BOOKS ON CANADIAN EDUCATION

HISTOIRE DE L'ENSEIGNEMENT AU QUEBEC: 1840-1971.

By L.-P. Audet.

2 volumes. Montreal: Holt, Rinehart and Winston, 1971, pp. 432 and 496.

This is a beautifully produced, and illustrated, history of education in Quebec province in which the distinguished author relates the public events and personalities to the underlying, and often conflicting, philosophies and to the historical roots in European thought. The first volume provides the historical background and European heritage of the French and Anglo-Saxon *colons*. It brings the story up to the conquest of Quebec (1760) and the Act of Union (1840). Volume Two discusses the development of educational provision and thinking from 1840, the growth of the two systems of education (1876-1959), closing with an analysis of the reforms of 1959-1971. The treatment is balanced, factual and concerned with the basic problems of the system—laws, personalities, educational philosophy, general social conditions. Reading lists are appended to each chapter. This is an ideal text to place in the hands of undergraduate and graduate students, and as jumping-off ground for research in this area.

EDUCATION: ONTARIO'S PREOCCUPATION.

By W. G., Fleming.

University of Toronto Press, 1972, pp. 330, \$10.00.

ONTARIO'S EDUCATIVE SOCIETY VOL. VI: SIGNIFICANT DEVELOPMENTS IN LOCAL SCHOOL SYSTEMS.

By W. G., Fleming.

University of Toronto Press, 1972, pp. 306, \$12.50.

ONTARIO'S EDUCATIVE SOCIETY VOL. VII: EDUCATIONAL CONTRIBUTIONS OF ASSOCIATIONS.

By W. G., Fleming.

University of Toronto Press, 1972, pp. 463, \$14.00.

These are two volumes of a seven-volume set dealing with the history, structure, personnel and activities within the system of Ontario's "educative society". The first title is a companion work, constituting an introduction to the series. This ambitious enterprise is the most comprehensive study of any educational system and provides not only massive collections of materials but also an analytical model for future studies of education in other provinces.

DIRECTORY OF EDUCATION STUDIES IN CANADA; 1971-1972.

Canadian Education Association.

Toronto, 1973, pp. 120, \$5.00.

This annual classified and annotated bibliography is the largest to date. One thousand studies are listed under relevant headings. Unpublished theses and mimeographed materials are listed. The directory is useful in a great number of ways—probably most of all in making communication easy between people working in the same research area.

CONTEMPORARY QUEBEC: AN ANALYTICAL BIBLIOGRAPHY.

By J. Cotnam.

Toronto: McClelland & Stewart, 1973, pp. 112, \$2.95.

Six pages are devoted to education, teaching and the school system in this comprehensive bibliographical guide to all aspects of contemporary culture, politics and society in Quebec Province.

Books for School and College Libraries

MATHEMATICAL THOUGHT FROM ANCIENT TO MODERN TIMES.

By M. Kline.

New York: Oxford University Press, 1972, pp. 1,238, \$38.50.

The text makes no concessions to the non-mathematical reader who is interested in the social and technological origins of mathematical thought. It is a high-level mathematical presentation organised chronologically by period, school or personality. From the recorded beginnings of mathematical thought in Babylon to the twentieth century the contributions of the great, as well as the more minor figures, are analyzed. Peripheral philosophers, like Kant and Hume are briefly referred to; physicists like Helmholtz, Hooke and Galileo take a bow at the appropriate places; but the emphasis is on the “*rigour* of the game” in Mrs Battle’s phrase.

ENDANGERED SPECIES.

By W. Ullrich, and Tylinek E., and I.

New York: Hart Publishing Co., 1972, pp. 284, \$15.00.

This is a beautiful collection of photographs and descriptions of the species of animals now under threat of extinction, largely as a result of the depredations of man in his predatory aspect. The only criticism one could possibly make is that *Homo sapiens* himself is not represented.

OTHER BOOKS RECEIVED

Books included in this list may be reviewed in a future issue.

C. M. BECK, B. X. CRITTENDEN, and E. V. SULLIVAN, *Moral Education: Interdisciplinary Approaches*, New York: Newman Press, 1971, pp. 402.

W. HAROLD BERNARD, *Psychology of Learning and Teaching*, New York: McGraw-Hill Book Company, 1972, pp. 500.

W. H. BURSTON, *Principles of History Teaching*, London: Methuen Educational Ltd., 1972, pp. 219, \$7.95 (cloth), \$5.65 (paper).

ROBERT E. CLARK, *Reference Group Theory and Delinquency*, New York: Behavioral Publications, Inc., 1972, pp. 129, \$9.59 (cloth), \$4.95 (paper).

D. C. CUSHENBERY, and K. J. GILREATH, *Effective Reading Instruction for Slow Learners*, Springfield: Charles C. Thomas, 1972, pp. 167, \$6.75.

W. B. ELLEY, and I. D. LIVINGSTONE, *External Examinations and Internal Assessments*, Wellington: New Zealand Council for Educational Research, 1972, pp. 192.

JAMES FREEMAN, H. J. BUTCHER, and T. CHRISTIE, *Creativity: A Selective Review of Research*, London: Society for Research into Higher Education Ltd., 1971, pp. 174.

P. FREIRE, *Cultural Action for Freedom*, England: Penguin Education, 1972, pp. 91, U.K. price 30p.

P. FREIRE, *Pedagogy of the Oppressed*, England: Penguin Education, 1972, pp. 153, U.K. price 40p.

C. E. IZARD, *The Face of Emotion*, New York: Appleton—Century—Crofts, 1971, pp. 468, \$14.95.

D. B. KENNEDY, and A. KERBER, *Resocialization: An American Experiment*, New York: Behavioral Publications, Inc., 1973, pp. 191, \$9.95 (cloth), \$4.95 (paper).

G. KEPPEL, *Design and Analysis: A Researcher's Handbook*, Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1973, pp. 658.

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The Alberta Journal of Educational Research

TABLE OF CONTENTS—VOLUME XVIII, 1972

- Anderson, G. J., and Hanrahan, J. P. *Effects of Age of School Entrance on Intelligence*. No. 1, March, 1-7.
- Anderson, G. J., and Walberg, H. J. *Class Size and the Social Environment of Learning: a Replication*. No. 4, December, 277-286.
- Bergen, J. J., and Deiseach, D. *Dimensions of the High School Student's Role*. No. 1, March, 8-14.
- Black, D. B., and Goding, W. E. *An Experiment in Classroom Management*. No. 1, March, 15-29.
- Blowers, E. A. *Barriers to the Education of Children from Low Income Families*. No. 1, March, 30-34.
- Bowd, A. D. *Some Determinants of School Achievement in Several Indian Groups*. No. 2, June, 69-76.
- Conklin, R. C., and Phelps, J. *Differences Between Applicants and Enrollees in a Mature Non-Matriculant Program*. No. 2, June, 77-81.
- Corfield, V. K. *Programmed Instruction as a Tool to Facilitate Perception of Alternatives*. No. 2, June, 82-90.
- Dawson, D. A. *Educational Quality Indices*. No. 1, March, 35-44.
- Forrest, A. *Clarendon's 'Dialogue Concerning Education': A Neglected Document in Seventeenth-Century Educational History*. No. 3, September, 211-222.
- Friesen, D. *Variations in Perceptions of Organizational Climate*. No. 2, June, 91-99.
- Goodlet, G. R. *Nongrading and Achievement: A Review*. No. 4, December, 237-242.
- Hickcox, E. S., and Ducharme, D. J. *Administrative Staffing Patterns in Ontario School Districts*. No. 2, June, 100-110.
- Humphreys, E. H. *Inequality and Rural Schools: Results of Surveys in 1967 and 1969*. No. 2, June, 111-123.
- Kennett, K. F. *Intelligence and Socio-economic Status in a Canadian Sample*. No. 1, March, 45-50.
- King, Ethel M., and Friesen, Doris T. *Children Who Read in Kindergarten*. No. 3, September, 147-161.
- Koziey, P. W., and Brauer, J. H. *Using Mental Practice to Improve Reading Performance*. No. 3, September, 190-195.
- Lehtiniemi, L. *A Tested Theory of Student Unrest*. No. 1, March, 51-58.
- Lemire, J. *Creativity and School: A Social Problem*. No. 4, December, 295-306.
- MacGregor, R. N. *A Review of Selected Art Tests and Evaluative Instruments*. No. 2, June, 124-132.

- Mackie, M. *School Teachers: The Popular Image*. No. 4, December, 267-276.
- Marjoribanks, K. *Achievement Orientation of Canadian Ethnic Groups*. No. 3, September, 162-173.
- Martin, J. F. *The Relationship Between Neuroticism and Attainment*. No. 4, December, 259-266.
- Matheson, W. *An Independent Validation of Bales' Concept of "Social Psychological Space"*. No. 3, September, 174-179.
- McLeish, J. *The Origin of Psychology as a Science: Ivan Mikhailovich Sechenov*. No. 3, September, 202-210.
- McLeish, J. *Special Review: The Seventh Mental Measurements Yearbook*. No. 3, September, 234-235.
- McLeish, J. *The Soviet Conquest of Illiteracy*. No. 4, December, 307-326.
- Perkins, S. A. *A Pilot Study of the Values of Public and Separate School Grade Twelve Students*. No. 3, September, 196-201.
- Richards, D. M. *Predicting the Demand for Teachers*. No. 2, June, 133-139.
- Smythe, P. C.; Hardy, Madeline; Stennett, R. G.; and Wilson, H. R. *Development Patterns in Elemental Reading: Phoneme Discrimination*. No. 1, March, 59-67.
- Stennett, R. G.; Smythe, P. C.; and Hardy, Madeline. *Language Background, Guessing, Mastery and Type of Error in Beginning Reading*. No. 3, September, 180-189.
- Storey, A. G. *Self Development in Adult Male Students in Relation to Success and Non-Success*. No. 2, June, 140-145.
- Sukdeo, F. *An Assessment of Student Quotas and Fees in Alberta Universities*. No. 3, September, 223-233.
- Thomas, V. *The Basic Writing Vocabulary of Elementary School Children*. No. 4, December, 243-248.
- Vernon, P. E. *The Validity of Divergent Thinking Tests*. No. 4, December, 249-258.
- Vigod, Z. *The Relationship Between Occupational Choice and Parental Occupation*. No. 4, December, 287-294.

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